E.S.

Vol. 111. Pt. 10. Pp. 237–329. 81 figs. 10th November, 1959.

COMMONWEALTH INST. ENTOMOLOGY LIBRARY
16 NOV 1959
SERIAL SEPARATE Eu. 3444

THE TRANSACTIONS OF THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

World List abbreviation: *Trans. R. ent. Soc. Lond.*

CONTENTS

PAGE

SPENCER, KENNETH A. A synopsis of the Ethiopian AGROMYZIDAE (DIPTERA) . . . 237–329, 81 figs.

LONDON:
PUBLISHED BY THE SOCIETY AND
SOLD AT ITS ROOMS, 41, QUEEN'S GATE, S.W.7.

Price £1 17s. 6d.

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

Founded 1833. Incorporated by Royal Charter 1885.

Patron :

HER MAJESTY THE QUEEN.

OFFICERS AND COUNCIL FOR THE SESSION, 1959–1960

DR. B. P. UVAROV, C.M.G., F.R.S., *President.*
DR. J. S. KENNEDY
DR. A. M. MASSEE, O.B.E. } *Vice-Presidents.*
MR. E. O. PEARSON
DR. N. E. HICKIN, *Treasurer.*
MR. PAUL FREEMAN, *Secretary.*
MR. W. H. POTTS, *Editor.*

Other Members of Council

PROFESSOR D. S. BERTRAM.
DR. C. G. BUTLER.
DR. A. M. EASTON.
DR. L. G. HIGGINS.
DR. B. M. HOBBY.
MR. H. OLDROYD.
PROFESSOR O. W. RICHARDS.
DR. N. WALOFF.
MR. M. J. WAY.
DR. C. B. WILLIAMS, F.R.S.

MISS E. EVANS, *Registrar.*

Finance and House Committee

DR. C. G. BUTLER (*Chairman*).

PROFESSOR D. S. BERTRAM.
DR. R. M. GREENSLADE.
DR. A. G. HAMILTON.
DR. D. J. LEWIS.
MR. H. L. G. STROYAN.

Publication and Library Committee

DR. B. M. HOBBY (*Chairman*)

MR. R. G. DAVIES.
DR. H. E. HINTON.
MR. T. G. HOWARTH.
MR. G. E. J. NIXON.
MR. H. OLDROYD.

Conservation (Insect Preservation) Committee

DR. A. M. MASSEE, O.B.E. (*Chairman*).

MR. R. B. BENSON.
DR. B. M. HOBBY.
MR. T. G. HOWARTH.
MR. N. D. RILEY, C.B.E.
MR. F. T. VALLINS.

The Executive Officers of the Society are *ex-officio* members of all Committees.

DELEGATES OF THE SOCIETY TO :

1. **British National Committee for Biology** (Royal Society).
   Mr. N. D. Riley, C.B.E., appointed 1955.
   Dr. H. E. Hinton, appointed 1958.
2. **Local Committee of Management of Wicken Fen.**
3. **National Trust for Places of Historic Interest or Natural Beauty.**
   Mr. N. D. Riley, C.B.E., appointed 1955.
4. **New Forest Association.**
   Mr. C. W. Mackworth-Praed, appointed 1948.
5. **New Forest Joint Committee.**
   Lt.-Col. F. C. Fraser, appointed 1949.
6. **Field Studies Council.**
   Dr. W. H. Thorpe, F.R.S., appointed 1944.
7. **Yorkshire Naturalists' Trust, Ltd.**
   Dr. W. D. Hincks, appointed 1946.
8. **The Biological Council.**
   Dr. N. E. Hickin, appointed 1952.
9. **The Parliamentary and Scientific Committee.**
   Dr. N. E. Hickin, appointed 1953.
10. **British Co-ordinating Committee for Nature Conservation.**
    Mr. E. B. Britton, appointed 1954.
11. **Council for Nature.**
    Dr. N. E. Hickin, appointed 1958.

A SYNOPSIS OF THE ETHIOPIAN AGROMYZIDAE (DIPTERA)

By Kenneth A. Spencer

(19, *Redington-road, Hampstead, London, N.W.*3)

Manuscript received 17th March, 1959

(Read 6th May, 1959)

With 81 Text-figures

Contents

		PAGE
I.	Introduction	237
II.	Acknowledgments	239
III.	Abbreviations and definitions	240
IV.	Systematic treatment	241
	1. Key to genera	241
	2. *Agromyza* Fallén	241
	3. *Penetagromyza* gen. n.	253
	4. *Melanagromyza* Hendel	254
	5. *Ophiomyia* Braschnikov	296
	6. *Cerodontha* Rondani	302
	7. *Phytobia* Lioy	303
	8. *Liriomyza* Mik	309
	9. *Phytagromyza* Hendel	313
	10. *Pseudonapomyza* Hendel	315
	11. *Phytoliriomyza* Hendel	318
	12. *Napomyza* Haliday	318
	13. *Phytomyza* Fallén	319
V.	Host Records	323
VI.	Species of economic importance	327
VII.	Summary	327
VIII.	References	328

I. Introduction

Our knowledge of the Ethiopian Agromyzidae has in the past been based on brief papers by Thomson (1869), Lamb (1912), Bezzi and Lamb (1926), de Meijere (1940) and more recently by Séguy (1951), Paulian (1953) and Hering (1957).

In this study I have examined all species hitherto described from the Ethiopian Region, Madagascar and the Indian Ocean and have also examined all unidentified material in the main Museums in Europe and S. Africa. The significant fact which emerges is that the Agromyzidae are obviously as widespread in Africa as in the other zoogeographical regions, although the relative importance of certain genera varies considerably from the pattern familiar from Europe and North America. Eighty-two new species are described, making the total now known in the Ethiopian region 128. This compares

with some 750 species described from the Palaearctic region and 206 from the Nearctic region (Frick, 1959). The evidence now available clearly suggests that a large number of new species awaits discovery and this will certainly be a rewarding field for any workers in Africa who care to take a specialised interest in this family.

This situation appears to be similar to that in South America, where hitherto only some 40 species have been recorded. During recent visits to Brazil, Venezuela, Colombia and Jamaica I have obtained in a few days' collecting approximately 40 new species (which will be described shortly) and Dr. P. Wygodzinsky, writing from Tucuman, has informed me that he has bred some 300 species, which have not yet received detailed examination.

Twelve of the 21 world genera of the family are now represented in the Ethiopian region, including one new genus, *Penetagromyza*, described below. By far the largest genus is *Melanagromyza* with 68 species, the next largest being *Agromyza* with 17. This proliferation of *Melanagromyza*, which in the Palaearctic region is one of the smaller genera, is accompanied by a striking reduction of the two genera *Phytomyza* and *Liriomyza*. These genera, which in the Palaearctic region have some 450 species, are now represented in Africa by a combined total of 16 species. The pattern in the Oriental region appears to be basically similar. In the Neotropical region, however, *Liriomyza* is well represented and there is a significant proliferation of the subgenus *Calycomyza* of the genus *Phytobia*.

The affinities of the species from the Seychelles, Mauritius, Rodriguez, Chagos and Madagascar are not, in most cases, strictly Ethiopian but it seemed desirable to include them in the keys to the Ethiopian species, since no comprehensive work with keys exists for the species from India and the remainder of the Oriental region.

This study has provided interesting new information on the division between the genera *Agromyza* and *Melanagromyza*. The accepted distinction—*Agromyza* having white halteres and *Melanagromyza* brown or black—is found to be no longer valid. One new species with dark brown halteres is referred to *Agromyza*, another with white halteres to *Melanagromyza*, while a third with halteres black below and white above is referred to *Agromyza*. A valid distinction between the genera appears to be the presence of a pair of well-defined pre-scutellar bristles in *Agromyza*, and the characteristic arrangement of two (rarely three) pairs of dorso-central bristles in *Melanagromyza*.

Sasakawa (1958) has recently erected a new genus *Japanagromyza* for species having white halteres but with dark stalks; pre-scutellar bristles are present. In view of the even wider variation in the colour of the halteres in the species referred to above, further material and study will be necessary before the correct generic placing of these species can be conclusively determined.

The Agromyzidae, which are mostly small flies with a body and wing length of 2–3 mm., are frequently extremely difficult to separate morphologically. This applies particularly to the genus *Melanagromyza*. The systematist derives the greatest assistance by a biological approach to this problem. A knowledge of the leaf-mine and host-plant can indicate striking differences in feeding habits of closely related species, and a knowledge of larva or puparium can reveal differences in otherwise virtually indistinguishable species. Hering has recently (1951) fully discussed the importance of this biological approach to the

Agromyzidae. Examples of the importance of a knowledge of the immature stages are given in figures 33 and 47, showing striking differences in puparia of specimens which might otherwise have been considered as belonging to the same species.

In view of the importance of bred specimens, leaf-mines and larvae or puparia in studying the Agromyzidae, a separate list of known host-plants has been prepared and is given on pages 323–327.

A small number of Agromyzidae are pests of considerable economic importance. *Melanagromyza phaseoli* (Tryon), which attacks young bean plants, occurs widely throughout Africa and has now been recorded even as far north as Palestine. Three new species bred from beans, *Melanagromyza chalcosoma*, *M. kikuyuana* and *M. vignalis*, are described below and these may all be potentially serious pests. A new leaf-miner on *Citrus* crops, *Melanagromyza citri*, is also described. A tabulation of these species of economic importance is given separately (page 327).

As this paper goes to press I have received additional material from Dr. Munro, Pretoria; Monsieur Basilewsky, Tervuren; Dr. Paulian, Madagascar; Mr. Stuckenberg, Pietermaritzburg; and from Dr. Per Brinck, Lund. To avoid a further serious delay in publication, this material will be dealt with later, either as a supplement to this paper or in the publications of the Museums concerned.

II. Acknowledgments

This paper was directly stimulated by a study of the Agromyzidae from the Cape Verde Islands, collected by the Finnish Expedition in 1953 and 1954 and kindly lent to me by Prof. Richard Frey. I would like to express my particular thanks to Prof. Frey for his generosity and assistance.

I have, in addition, received material or facilities for study from the following:

Dr. G. Kruseman, Zoological Museum, Amsterdam.
Prof. E. M. Hering, Zoologisches Museum, Berlin.
Dr. J. Smart, University Museum, Cambridge.
Mr. H. Oldroyd, British Museum (Natural History), London.
The late Dr. F. Van Emden, Commonwealth Institute of Entomology, London.
Dr. R. Paulian, Institut de Recherches Scientifiques, Madagascar.
Prof. E. Séguy, Muséum national d'Histoire Naturelle, Paris.
Mr. B. R. Stuckenberg, Natal Museum, Pietermaritzburg.
Dr. H. K. Munro, Transvaal Museum, Pretoria.
Dr. L. Brundin, Naturhistorika Riksmuseum, Stockholm.
Prof. E. Lindner, Museum für Naturkunde, Stuttgart.
Monsieur P. Basilewsky, Musée Royal du Congo Belge, Tervuren.
Dr. M. Beier, Naturhistorisches Museum, Vienna.

My very best thanks are due to the above, whose willing co-operation has alone made this paper possible.

I wish to extend my sincere thanks to Monsieur P. Mauny of the I.F.A.N., Dakar, for the assistance provided for collecting in the area during a visit to Dakar in 1957.

My thanks are also due to the Director, Royal Botanic Gardens, Kew, for valuable assistance in interpreting African vernacular plant names and for other botanical information.

Finally, I would like to give my special thanks to Mr. Oldroyd for his constant advice and assistance and to Prof. Hering who has given me much valuable guidance throughout the preparation of this paper.

III. Abbreviations and Definitions

acr, acrostichal hairs.
dc, dorsocentral bristles; these are numbered from the hind margin of the mesonotum forward, the strongest *dc* being accepted as the first.
ia, intra-alar bristle.
i.pa, inner post-alar bristle.
pa, post-alar bristle.
sa, supra-alar bristle.
ori, lower fronto-orbital bristle.
ors, upper fronto-orbital bristle.
prsc, pre-scutellar bristles.
t_2, mid-tibia.
pvt, post-vertical bristles.
vt, vertical bristle.
vti, inner vertical bristle.
vte, outer vertical bristle.
second costal segment, the section of the costa between the apex of veins *r1* and *r2* + *3*.
third costal segment, the section of the costa between the apex of veins *r2* + *3* and *r4* + *5*.
fourth costal segment, the section of the costa between the apex of veins *r4* + *5* and *m1* + *2*.
r1, first vein.
r2 + *3*, second vein.
r4 + *5*, third vein.
m1 + 2, fourth vein.
r-m, anterior cross-vein.
m-m, posterior cross-vein.

Drawings: the scale line, unless otherwise indicated, represents 0·5 mm.

IV. Systematic Treatment

1. Key to Genera
(after Frick)

1 Subcosta developed throughout its length, coalescing with R_1 before reaching costa 2
– Subcosta becoming a fold distally and ending in costa separately and basad of R_1 5
2 Halteres normally white or yellowish, at least in upper half; if brown, pre-scutellar bristles present . . . . . **Agromyza** Fallén
– Halteres black or dark brown, at least in lower half; if white, no pre-scutellars present 3
3 Facial keel between antennae prominent, at least slightly bulbous **Ophiomyia** Braschnikov
– Facial keel narrow and flattened 4
4 Post-verticals and cross-vein *m-m* always present . **Melanagromyza** Hendel
– Post-verticals and cross-vein *m-m* lacking. Costa extending only to R_5 . . . . . **Penetagromyza** gen. n.
5 Two scutellar bristles . . . . . **Cerodontha** Rondani
– Four scutellar bristles 6
6 Orbital setulae erect or reclinate, sometimes weak or absent . . . 7
– Orbital setulae proclinate, well-developed 10
7 Costa reaching M_{1+2} 8
– Costa only reaching R_{4+5} 9
8 Scutellum same colour as mesonotum, black or grey . . **Phytobia** Lioy
– Scutellum yellow, at least centrally . . . . . **Liriomyza** Mik
9 Lower (second) basal cell and discal cell confluent, basal section of vein *m3 + 4* lacking; first costal segment conspicuously short, at most one and three-quarter times length of third **Pseudonapomyza** Hendel
– Lower (second) basal and discal cells distinct; first costal segment at least two and a half times length of third . . . **Phytagromyza** Hendel
10 Costa reaching apex of M_{1+2} . . . . . **Phytoliriomyza** Hendel
— Costa only reaching apex of R_{4+5} 11
11 Cross-vein *m-m* absent . . . . . **Phytomyza** Fallén
— Cross-vein *m-m* present . . . . . **Napomyza** Haliday

2. Agromyza Fallén

The genus *Agromyza* is widely represented throughout the Palaearctic and Nearctic Regions and a number of species occur in the Neotropical Region. It has hitherto been represented in the Ethiopian Region by two species. Fourteen new species are now described, and one species, originally described in the genus *Melanagromyza*, is now placed in this genus.

It has hitherto been accepted that an essential characteristic of this genus was the pale halteres, separating it from *Melanagromyza*, which has black or dark brown halteres. Two species, however, with at least partially dark halteres are now placed in this genus—*A. somereni* and *A. nigrihalterata*. Both have a well-defined pair of prescutellar bristles and in the characteristic arrangement of dorso-central bristles are typical *Agromyza* species.

Sasakawa (1958) has recently erected the new genus *Japanagromyza* for species having halteres with a white knob but dark stalk and possessing a pair

of pre-scutellars. Further material and study will be necessary to decide whether these two species can properly be placed in this new genus.

Of the 17 Ethiopian species, the biology of only four is known; these are all leaf-miners—two on Malvaceae, one on Gramineae and one on Boraginaceae. The Ethiopian species can be identified from the following key:

1	Halteres at least partially dark, brown or black	2
–	Halteres light, white or yellow	3
2	Halteres white at top, black below	**nigrihalterata***
–	Halteres entirely dark brown	**somereni***
3	Presutural *dc* absent or scarcely distinguishable from *acr*	4
–	Presutural *dc* well-defined, mesonotum with 3 + 1 *dc*	14
4	Frons predominantly reddish	5
–	Frons black to brown	6
5	Mesonotum shining black, third antennal segment reddish-brown. Small species, wing length 2 mm.	**verdensis***
–	Mesonotum matt grey, third antennal segment black. Large species, wing length, 3·4 mm.	**rufipes** Meigen
6	Squamae and fringe pale, white or yellowish	7
–	Squamal fringe dark, black or brown	9
7	Third antennal segment pale brown	8
–	Third antennal segment black	**abutilonis***
8	Three ori†, epistoma broad	**pallidifrons***
–	Two ori, epistoma linear	**malvaceivora** Séguy
9	Wings distinctly infuscated	**infusca***
–	Wings hyaline, normal	10
10	Legs uniformly black	11
—	Tarsi distinctly paler, brown	13
11	Third *dc* conspicuously small, at most one-quarter length of second	**munduleae** (Séguy)
—	Third *dc* at least half length of second	12
12	Frons narrow, equal to width of eye	**catherinae***
—	Frons wider, one and a half times width of eye	**oliviae***
13	Wing base conspicuously yellowish, all veins pale; frons slightly projecting	**penniseti***
—	All veins, even at wing base, dark brown; frons not projecting	**susannae***
14	Costa extending only to vein *r5*	**eyeni***
—	Costa extending to *m1* + *2*	15
15	Last segment of vein *m4* shorter or, at most, equal to penultimate; third antennal segment bearing spine in addition to arista. Large species, wing length 3·6 mm.	**uniseta***
—	Last segment of *m4* longer than penultimate	16
16	Pleura and wing base entirely black	**ruandensis***
—	Mesopleura and pteropleura with yellow upper margins, wing base bright yellow	**flavosquamata***

Agromyza abutilonis sp. n.

Head: frons slightly wider than eye, projecting above eye in profile from lower ors† to base of antennae; two ors, the upper slightly longer and directed upwards and slightly

* Described below as new.

† For explanation see p. 240.

outwards, the lower directed slightly inwards; two equal ori, the upper directed inwards and upwards, the lower directed inwards; distance between ori and between upper ori and lower ors equal, slightly less than that between ors; orbital setulae sparse, fine but relatively long, most numerous at lower ori, extending to midway between ors; ocellar triangle reaching to midway between ors; orbits slightly widening towards base of antennae; lunule small, entirely enclosed by raised orbits and frons; cheeks linear, jowls broad, conspicuously elongated at rear, one-quarter length of eye; third antennal segment slightly longer than broad, largely rectangular, pubescence slight; arista short, with slight pubescence, equal to width of eye; eye length : width ratio 21 : 14; mouth-margin with narrow but conspicuous epistoma above.

Mesonotum: three distinct *dc*, second two-thirds length of first, third half length of second; in some specimens a fourth small *dc*, not greatly larger than *acr*; third *dc* at level of *sa*; *ia* twice length of small *i. pa*; *prsc* strong, equal to second *dc*; *acr* coarse, in 8 rows.

Wing: length in female 2·7 mm., in male 2·2 mm.; costa extending to *m1* + *2*, *r-m* at or slightly beyond midpoint of discal cell, last segment of *m4* four-fifths length of penultimate.

Legs: *t2* with two postero-dorsal bristles.

Abdomen: hairs coarse; in male epandrium slightly enlarged.

Colour: frons and jowls matt brown, orbits slightly shining, ocellar triangle shining-black; face shining-black; mesonotum largely shining-black, slightly matt when viewed from the front; abdomen entirely shining-black; femora black, tibiae and tarsi more brownish; wings hyaline, veins pale brown, almost yellowish at base; squamae, including fringe, pure silvery-white.

Holotype ♀, UGANDA: Kampala, 17.v.1943, bred from leaf-mine on *Abutilon* sp. (*H. Hargreaves*); *allotype* ♂, same data; both deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.). *Paratypes:* 4 ♀, same data, 3 in British Museum (Nat. Hist.), 1 in author's collection.

Agromyza catherinae sp. n.

Head: frons narrow, equal to width of eye, not projecting above eye in profile; two ors directed upwards, the upper stronger; two equal ori similar to lower ors directed upwards and inwards; distance between ors twice that between ori; distance between lower ors and upper ori slightly greater than between ori; orbital setulae long between ori, diminishing in size and extending to midway between ors; ocellar triangle extending to midway between ors; lunule small, low, not extending above lower ori; cheeks linear; jowls somewhat extended at rear, at deepest point one-sixth height of eye; eye length : width ratio 30 : 20; broad epistoma present; face with well-defined median keel; third antennal segment rounded but longer than broad, arista slightly longer than width of eye, with well-defined pubescence; one strong vibrissa, twice as long as surrounding peristomal hairs.

Mesonotum: four well-defined *dc*, with three closely adjoining pre-sutural hairs representing *dc* but scarcely longer than *acr*; post-sutural *dc* greatly diminishing in size, fourth only twice length of *acr*; these coarse and long but not extending to first *dc*; *prsc* equal to second *dc*; *ia* slightly stronger than *i. pa.*

Wing: length in female 3·4 mm.; first cross-vein at mid-point of discal cell, last segment of vein *m4* short, in ratio 20 : 37 with penultimate.

Legs: *t2* with two strong postero-dorsal bristles.

Colour: frons uniformly matt black, ocellar triangle and base of orbital bristles weakly shining black; lunule blackish-grey; jowls, face and antennae uniformly black; mesonotum shining-black; pleural margins scarcely differentiated; femora black, tibiae dark, blackish-brown, tarsi only slightly lighter; squamae clear grey with black margins and

conspicuous black fringe; wings hyaline, vein *r2 + 3* dark-brown, remainder distinctly lighter.

Holotype ♀, SOUTH AFRICA: Wylies Poort, Zoutpansberg, 29.i.1955 (*B. R. S.* and *P. G.*), in Natal Museum, Pietermaritzburg.

Agromyza eyeni sp. n.

Head (fig. 1): frons broad, one and a half times width of eye, not projecting above eye in profile; ocellar triangle completely inconspicuous, scarcely differentiated from frons; lunule small, below plane of frons; two ors and two ori (all except lower ori missing); ors more widely spaced than ori, lower ori strong, incurved; orbital setulae very short and slender, extending to upper ors; cheeks linear, jowls narrow, straight below eye, one-tenth height of eye; vibrissa very strong, equal to lower ori, peristomal hairs slight; eye broad, length : width ratio 20 : 17; narrow facial keel, no epistoma present; antennae not greatly projecting above eye, third segment relatively large, round.

Mesonotum: 2 + 1 strong *dc*; second two-thirds length of first, third two-thirds length of second; presutural *dc* strong (but broken and relative length not ascertainable); distance between first and second one and half times that between third and second, fourth and third equidistant before and behind suture; *prsc* weak, equal to *i. pa*, more slender than third *dc*; *ia* equal to third *dc*.

Wing (fig. 2): length in female 2·3 mm.; costa extending only to *r4 +5*, first cross-vein at hind-third of discal cell; last segment of vein *m4* long, in ratio 22 : 15 with penultimate.

Legs: t2 with one strong postero-dorsal bristle; coxae in all legs bearing some 4 or 5 conspicuously long, strong curved bristles.

Colour: frons matt black, ocellar triangle with only slightest trace of shine; lunule grey, jowls dark brown, face black; third antennal segment brown, somewhat light; mesonotum black, matt, with only slight subshine; pleura shining-black; legs black, tibiae and tarsi not lighter; abdomen shining-black; squamae brownish, becoming greyish-black at margins, fringe blackish-brown; wings slightly infuscated, brownish, veins dark.

Holotype ♀, BELGIAN CONGO: Mayidi, 1945 (*Rév. P. Van Eyen*), in Musée Royal du Congo Belge, Tervuren.

Agromyza flavosquamata sp. n.

Head: frons broad, almost twice width of eye, not projecting above eye in profile; orbital bristles conspicuously strong, two ors (missing) and two ori; both ori directed inwards and upwards, the lower weaker than upper; distance between ori and between upper ori and lower ors equal, half that between ors; orbital setulae short and fine, from lower ori to upper ors; ocellar triangle scarcely differentiated beyond foremost ocellus; lunule very low, not extending above level of lower ori; antennae separated by low keel, third segment with short, coarse pubescence above, arista long, shortly plumose; cheeks linear, jowls narrow, deepest at rear. one-eighth height of eye; vibrissa strong, equal to lower ori; length : width ratio of eye 25 : 20.

Mesonotum: 3 + 1 strong *dc*; distance between first and second scarcely greater than between second and third, second at level of *sa*; fourth equal to third, the former well before, the latter immediately behind suture; *ia* strong, almost equal to second *dc*; *i.pa* short, equal to *prsc*; *acr* short in eight rows.

Wing: length in male 2·7 mm.; costa extending to vein *m1* + 2, *r-m* slightly beyond centre of discal cell, the last segment of *m4* in ratio 25 : 20 with penultimate.

Legs: t2 with two short but strong postero-dorsal bristles.

Abdomen : epandrium large, cerci small.

Colour : frons matt black, ocellar triangle and orbits at base of bristles weakly shining; lunule grey; mesonotum shining-black; pleura predominantly shining black but mesopleura narrowly yellow at upper margin and upper hind corner; notopleural area distinctly brownish; pteropleura bright yellow in upper front corner, brownish-black below; wing base conspicuously yellow, wings otherwise normally hyaline; squamae whitish-yellow, with black borders and fringe; legs and abdomen black.

Holotype ♂, NIGERIA: Oshogbo, 28.viii.1910 (*T. F. G. M.*), deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.).

Agromyza infusca sp. n.

A large species with fuscous wings.

Head (fig. 3): frons one and a half times width of eye, projecting above eye in profile from base of antennae to *pvt*; two strong ors directed upwards, two ori, the lower directed inwards; distance between ors one and a half times that between lower ors and upper ori; distance between ori little more than half that between ors; the two ors equidistant from eye margin, the lower ori further removed from eye margins than upper; orbital setulae fine and sparse; ocellar triangle scarcely extending below upper ors; lunule lower than semicircle, below plane of frons; cheeks forming ring below eye, jowls broad, conspicuously elongated, one-quarter height of eye; eye one and a half times as long as broad; face with inconspicuous, rounded median keel; third antennal segment large, longer than broad, rectangular but with slightly rounded corners.

Mesonotum : 4 + 2 *dc*, second two-thirds length of first, third, fourth, fifth and sixth each half length of preceding one; fourth and fifth equidistant before and behind suture; *prsc* strong, equal to second *dc*; *acr* coarse, in ten rows; *ia* equal to *i.pa*, each equal to third *dc*.

Wing : length in female 3·2 mm.; costa extending to vein *m1* + *2*, *r-m* at mid-point of discal cell, last segment of *m4* short, half length of penultimate.

Legs : t2 with two postero-dorsal bristles.

Abdomen : thickly clothed in coarse hairs.

Colour : frons matt black to blackish-brown, ocellar triangle weakly shining-black, lunule more greyish; third antennal segment predominantly dark, blackish-brown but lighter brown below, where adjoining second segment; second segment lighter brown above, black below; first segment black; mesonotum matt blackish, with distinct subshine; pleura black with distinct, narrow brown borders; abdomen shining-black, margin of sixth tergite lighter; wings with distinct brownish-orange infuscation, veins all light brown; squamae whitish, with darker orange-brownish margins; fringe dark-brown.

Holotype ♀, TANGANYIKA: Matengo, W.S.W. of Songea; Ugano, 1,500–1,700 m., 1–8.iv.1936 (*Zerny*), in Naturhistorisches Museum, Vienna. *Paratypes*, 2 ♀, same data, 1 deposited with type, 1 in author's collection.

Agromyza malvaceivora Séguy, 1951

MADAGASCAR: Tsimbazaza, bred from leaf-mine on Malvaceae sp. *Holotype* in Muséum national d'Histoire Naturelle, Paris.

Examination of the holotype shows that it has not 3 + 1 *dc*, in the accepted sense of a well-defined bristle in front of the suture; there are rather 4 + 0 *dc*, the third and fourth being small, equal, at most half the length of the second.

The species most closely resembles *A. pallidifrons* sp.n. from which it can be distinguished by having only two ori and an almost linear epistoma; the latter species has three ori and an exceptionally broad epistoma.

The leaf-mine, figured by Paulian (1953), is an irregular upper-surface blotch.

Agromyza munduleae (Séguy), **comb. nov.**

Melanagromyza munduleae Séguy, 1951.

This species was placed in *Melanagromyza* by virtue of the apparently dark halteres; examination of the holotype shows these to be certainly darker than is normal in *Agromyza*, but they are still essentially pale and the darkening appears to be due to discoloration. In other essential characters, such as arrangement of *dc* and presence of *prsc*, the species is a typical *Agromyza*.

I briefly redescribe the species as follows:

Head: largely collapsed, little detail discernible; jowls angular, somewhat extended at rear; cheeks linear; third antennal segment small, round; arista long, bare.

Mesonotum: two strong *dc*, preceded by several very small further ones; second two-thirds length of first; third and fourth equal, less than quarter second; second, third and fourth equidistant; *prsc* well-defined, two-thirds length of second *dc*.

Colour: head entirely black; mesonotum black, largely shining but with faint dusting; legs entirely black; wings (figured by Séguy, 1951) hyaline, squamae grey, fringe black.

MADAGASCAR: Tananarive, Tsimbazaza, bred from leaf-mine on *Mundulea suberosa* Benth. Holotype in Muséum national d'Histoire Naturelle, Paris.

Agromyza nigrihalterata sp. n.

Head (fig. 4): frons narrow, equal to width of eye, not projecting above eye in profile; two strong ors, two weaker ori; lower ori directed inwards and upwards (other bristles missing in all three available specimens but detectable from the well-defined pits at their base); distance between lower ors and upper ori slightly greater than between ors; distance between ori less than between ors; orbital setulae fine, sparse; ocellar triangle inconspicuous, not extending to lower ors; lunule slightly higher than a semicircle, upper margin reaching to level of lower ori; cheeks linear, jowls rounded but forming distinct angle at deepest point below centre of eye, one tenth height of eye; eye conspicuously longer than broad, length : width ratio 30 : 20; third antennal segment rounded but somewhat longer below, arista shorter than eye length, in ratio 25 : 30, not conspicuously plumose; one strong vibrissa, with some twelve strong peristomal hairs.

Mesonotum: two strong *dc*, third and fourth distinct but weak, none before suture; second two-thirds length of first, at level of *sa*; second, third and fourth equidistant, conspicuously close, third less than one-third length of second, fourth two-thirds third; *prsc* strong, equal to *i.pa*; no *ia*; *acr* regular, thick, in ten rows, scattered hairs reaching *prsc*.

Wing: length 3·1 mm.; costa extending strongly to *m1* + *2*, *r-m* at mid-point of discal cell, at characteristic oblique angle to *r4* + *5*; last segment of *m4* slightly more than two-thirds length of penultimate, in ratio 22 : 30.

Legs: *t2* with two strong postero-dorsal bristles.

Colour: black; frons matt, ocellar triangle weakly shining; lunule greyish; mesonotum and abdomen conspicuously shining; halteres deep black except at top, which is clear white; the boundary between black and white clearly defined, with no gradual transition; wings hyaline, veins blackish-brown; squamae dirty-whitish, fringe dark, ochraceous-brown.

Holotype ♀, KENYA: Meru, vii.1943 (*Van Someren*), deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.). *Paratypes*,

2 ♀, Belgian Congo: Ruanda, 2100 m., in Musée Royal du Congo Belge, Tervuren, and Rutshuru, in author's collection.

Agromyza oliviae sp. n.

Head (fig. 5): frons one and a half times width of eye, slightly projecting above eye in profile; two strong equal ors; two ori, the lower weaker and directed inwards; orbital setulae very sparse; distance between ors and between lower ors and upper ori equal, that between ori less; ocellar triangle with apex extending to lower ors; lunule small, lower than semicircle; cheeks below eye linear, jowls greatly elongated at rear, at deepest point one-third height of eye; third antennal segment round, arista plumose, equal in length to width of eye; eye length : width ratio 23 : 18; narrow epistoma present.

Mesonotum: 4 + 0 *dc*, diminishing greatly in size, fourth immediately before suture and scarcely longer than *acr*; pre-sutural *dc*, if present, not distinguishable from *acr*; *acr* coarse and long.

Wing: length in female 3·0 mm.; costa extending to *m1* + *2*, *r-m* before midpoint of discal cell, last segment of *m4* short, in ratio 17 : 33 to penultimate.

Legs: *t2* with two strong posterodorsal bristles.

Abdomen: covered with coarse, long hairs.

Colour: frons matt black, orbits slightly greyish, ocellar triangle weakly shining, lunule grey; jowls and face slightly shining-black; antennae black, mesonotum shining-black, pleura uniformly black with very slightly lighter margins; femora and tibiae dark blackish-brown; knee on fore-legs and all tarsi conspicuously lighter brown; squamae greyish-brown with black fringe; wings with slight but distinct brownish tinge, veins brown.

Holotype ♀, Tanganyika: Matengo, W.S.W. of Songea, Ugano, 1500–1700 m., 1–8.iv.1936 (*Zerny*), in Naturhistorisches Museum, Vienna. *Paratype*, ♀, same data, in author's collection.

Agromyza pallidifrons sp. n.

Head (fig. 6): frons one and a half times width of eye, in profile projecting increasingly above eye from lower ors to base of antennae; two ors, the upper slightly stronger, directed upwards, the lower predominantly inwards; three equal ori all incurved; all orbital bristles long but fine, basal pits set well away from eye margin; orbital setulae fine and very sparse; ocellar triangle extending to midway between ors; lunule higher than semicircle, sloping upwards to level of conspicuously raised frons; cheeks forming distinct ring below eye, jowls angular, greatly extended at rear, at deepest point one-third height of eye; face with narrow keel separating antennae, continuing from prominent epistoma equal to length of third antennal segment; third antennal segment straight above, rounded below, arista short, equal to width of eye; eye length : width ratio 25 : 18.

Mesonotum: two strong *dc*, the second arising midway between *sa* and the strong *ia* and equal to the two strong *prsc*; third *dc* at level of *sa*, one-third length of second; small *pa* stronger than first *dc*, *i.pa* half length of second *dc*; *acr* thick in front, in ten rows, diminishing between second *dc* but some hairs at level of *prsc*.

Wing: length in female 2·8 mm., in male 2·7 mm.; costa extending to veins *m1* + *2*, *r-m* at midpoint of discal cell, last segment of vein *m4* slightly less than two-thirds penultimate, in ratio 20 : 32.

Legs: *t2* with one strong postero-dorsal bristle.

Abdomen: hairs long; in female four long hairs on basal cone of ovipositor; in male cerci conspicuously long.

Colour: frons matt brown, orbits somewhat lighter, ocellar triangle weakly shining, blackish; lunule greyish-brown; face black, epistoma and jowls dark brown; third

antennal segment pale yellowish-brown, with slight darkening on upper corner; second segment similar, first segment black; mesonotum and all pleura shining-black; abdomen similar; legs and femora blackish-brown, knee on fore legs distinctly lighter; all tibiae and tarsi lighter brown; squamae whitish-grey, margins scarcely darker, fringe whitish-yellow; wings hyaline, all veins pale brown.

Holotype ♀, S. Rhodesia: Oozani River Bridge, i.1955 (*B. R. Stuckenberg*), in Natal Museum; *allotype* ♂ and one ♂ *paratype*, Belgian Congo: Elizabethville, 22.xi.1955 (*G. D'haenens*); allotype in Musée Royal du Congo Belge, Tervuren, paratype in author's collection.

In the characteristic shape of the head this species closely resembles the Palaearctic *A. intermittens* Beck., 1907. The new species is thus almost certainly also a miner on one of the Gramineae.

Agromyza penniseti sp. n.

Head: frons broad, one and a half times width of eye, not projecting above eye in profile or at most slightly near base of antennae; two ors, directed upwards, the upper appreciably stronger; two equal ori directed inwards, similar to lower ors; distance between ors slightly greater than between ori; ori and lower ors equidistant; base of ors at inner margin of orbits distinctly further from eye margin than base of ori; orbital setulae short and sparse; ocellar triangle extending to lower ors, apex forming distinct angle; lunule small, semi-circular; orbits conspicuously differentiated; cheeks forming narrow ring below eye, jowls extended at rear but narrow below centre of eye; eye large, length : width ratio 26 :16; third antennal segment large, slightly longer than broad, rounded at end; arista without conspicuous pubescence; length in ratio 20 : 16 to eye width; face with distinct raised keel, narrow epistoma present.

Mesonotum: three distinct *dc*, those beyond scarcely differentiated from *acr*; second *dc* three-quarters length of first, third one-third length of second, distance between first and second one and a half times that between second and third; *sa* midway between level of second and third *dc*; *ia* slightly weaker than second *dc*; *i.pa* slightly longer than third *dc*; *prsc* conspicuously strong, intermediate between first and second *dc*; *acr* in eight rows, not extending beyond *prsc*.

Wing: length in male 2·7 mm.; in female 2·8 mm; costa extending to vein *m1* + *2*, first cross-vein conspicuously oblique, at midpoint of discal cell, last segment of vein *m4* half length of penultimate.

Legs: *t2* with two postero-dorsal bristles.

Colour: frons matt brown, normally paler behind, ocellar triangle and base of orbital bristles conspicuously shining; orbits slightly paler than adjoining frons; lunule grey; jowls and face matt black; third antennal segment blackish-brown, paler in lower half; mesonotum shining-black but with slight dusting; pleura largely shining-black but humeral callus and notopleural area distinctly paler, brownish; abdomen shining-black; legs—femora and tibiae blackish-brown, tarsi pale brown; wings faintly fuscous, veins pale brown; squamae whitish, fringe dark, contrasting, at least pale brown.

Holotype ♂, Cameroons: Ekopa, 18.v.1938, bred from leaf-mine on *Pennisetum purpureum* Schum. (*H. Buhr*), in Zoologisches Museum, Berlin. *Allotype* ♀ and 4 ♂ and 4 ♀ *paratypes*, same data, in Zoologisches Museum der Humboldt Universität, Berlin; 1 ♂ and 1 ♀ paratype in author's collection.

Larva and puparium were described by de Meijere (1940 : 163) under *Agromyza* sp. 3.

I also refer to this species an imperfectly developed specimen I obtained from a mine found near Dakar, French West Africa, on 1.viii.57 on *Digitaria*

adscendens Henrard (fig. 7); the fly emerged on 7th August. The puparium appears to be identical to that figured by de Meijere.

The leaf-mine is upper-surface, initially linear, running either up or down the leaf, later widening irregularly. Two or more larvae may feed together and the mine can then fill the entire leaf. It is distinctly greenish with frass scattered irregularly in fine grains or larger lumps. The puparium remains in the mine and is glued to the leaf by frass.

Agromyza ruandensis sp. n.

Head (largely collapsed and accurate description impossible): frons not projecting above eye in profile; ocellar triangle inconspicuous, scarcely differentiated from frons; orbital bristles conspicuously strong; two equal ors, three ori, the lower only slightly weaker; orbital setulae extending to upper ors; cheeks appear to form narrow ring below eye, jowls angular but not greatly elongated; vibrissa strong, as also peristomal hairs.

Mesonotum: 3 + 1 strong *dc*; second two-thirds length of first, third not appreciably weaker than second, fourth conspicuously strong, equal to third; second *dc* slightly in front of *sa*, third immediately behind, fourth well before suture; *prsc* slender and weak; *acr* coarse, unusually long, in eight rows.

Wing: length in male 2·9 mm.; all veins strong; costa extending to *m1* +2, *r-m* at front third of discal cell, last segment of *m4* long, in ratio 30 : 20 with penultimate.

Legs: *t2* with one strong postero-dorsal bristle; coxae and femora with conspicuously long hairs.

Abdomen: hairs coarse and long; in male epandrium enlarged but cerci small.

Colour: frons matt black, ocellar triangle scarcely shining; third antennal segment and face black; mesonotum black, largely matt but with distinct sub-shine; pleura, legs, abdomen similar; squamae grey, fringe deep black; wings hyaline but dark, veins black.

Holotype ♂, Belgian Congo: Ruanda, Contref. Est Muhavura, 2100 m., 28.i.1953 (*P. Basilewsky*), in collection of Musée Royal du Congo Belge, Tervuren.

Agromyza rufipes Meigen, 1830

South-West Africa: Cameroons, leaf-mines on *Cynoglossum* sp. De Meijere (1940 : 161) referred to this species larvae and puparia collected by Buhr in 1938.

No adults have been recorded from Africa and the species requires confirmation.

Agromyza somereni sp. n.

Head: frons not projecting above eye in profile (both eyes sunk); two ori, the upper longer; two long equal ori, equal to lower ors; orbital setulae reclinate, fine, sparse, long; ocellar triangle relatively small, extending at most to lower ors; lunule small, sunk below frons; jowls conspicuously angular, deepest in centre below eye, one-quarter height of eye; cheeks linear; third antennal segment small, arista distinctly plumose; broad epistoma present.

Mesonotum: three distinct *dc* and several smaller ones becoming indistinguishable from *acr*; second *dc* two-thirds length of first, third half length of second; distance between first and second *dc* slightly greater than between second and third; third and second equidistant in front of and behind *sa*; *ia* slightly weaker than second *dc*; *i.pa* equal

to third *dc*; *prsc* strong, equal to second *dc*; *acr* coarse, in eight rows, only individual hairs behind second *dc*.

Wing: length in male 2·3 mm.; costa extending to *m1* + *2*, *r-m* before midpoint of discal cell; last and penultimate segments of *m4* in ratio 15 : 20.

Legs: t2 with two postero-dorsal bristles.

Abdomen: covered in coarse hairs; epandrium small, normal, cerci broad.

Colour: frons matt black, ocellar triangle and orbits weakly shining; mesonotum and abdomen shining black; wings hyaline, veins black; halteres dark brown; squamae dark grey, fringe blackish.

Holotype ♂, KENYA: Ngong, v.1945 (*Van Someren*), deposited in British Museum (Nat. Hist.) by Commonwealth Institute of Entomology.

This species belongs unmistakeably to the genus *Agromyza*, but is unique in having entirely brown halteres.

Agromyza susannae sp. n.

Head (fig. 8): frons relatively narrow, equal to width of eye, not projecting above eye in profile; two ors directed upwards, the upper only slightly stronger; two ori directed inwards and upwards, the upper equal to lower ors, the lower somewhat weaker; distance between ors only slightly greater than between ori, one and a half times distance between lower ors and upper ori; orbital setulae short but prominent in area of ori, ceasing before lower ors; ocellar triangle inconspicuous, extending only slightly beyond upper ors, rounded at end; lunule small, semi-circular; cheeks conspicuous below eye, jowls somewhat extended at rear forming angle of 90°, at deepest point in ratio 4 : 22 with height of eye; one prominent vibrissa, peristomal hairs slender; facial keel slight; third antennal segment distinctly narrowing distally, slightly concave at top.

Mesonotum: two prominent *dc*, second two-thirds length of first; third slight, only twice length of *acr*; fourth, if present, scarcely distinguishable from *acr*; no pre-sutural *dc*; *ia* slightly shorter, first *dc* slightly longer than *prsc*; *acr* short, regular, in ten rows.

Wing: length in male 2·3 mm.; costa extending to *m1* + *2*, first cross-vein at midpoint of discal cell, ratio of last to penultimate segment of vein *m4* 16 : 27.

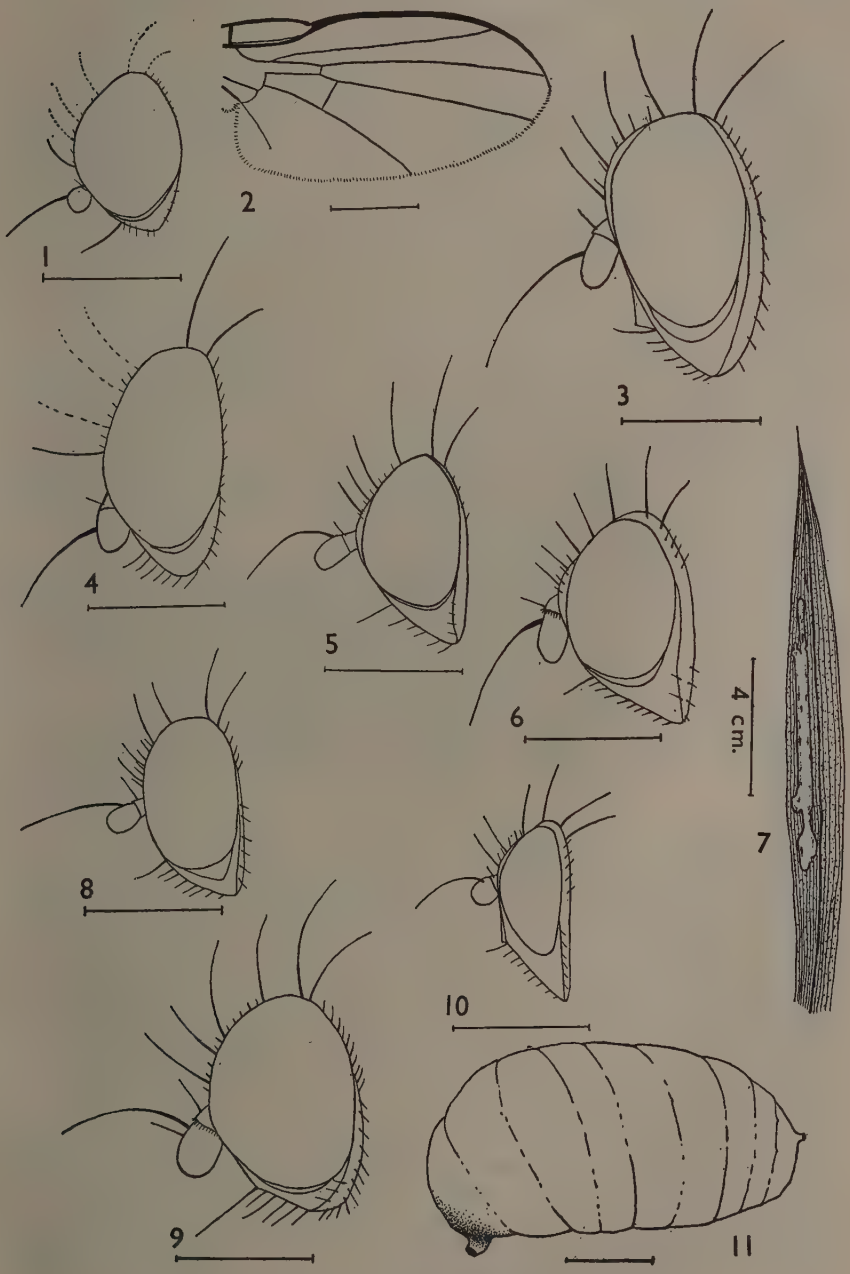
Legs: t2 with two postero-dorsal bristles.

Colour: frons matt black, ocellar triangle only weakly shining; orbits below upper ori slightly greying, similar to lunule; jowls greyish-brown, face black; third antennal segment brownish-black; mesonotum shining-black; pleura black, margins dark brown, inconspicuous; legs predominantly dark; femora and tibiae on mid- and hind-legs, tibiae on fore-legs and all tarsi lighter brown; squamae dirty white, margins inconspicuously brown, fringe distinctly dark, brown but not black; wings hyaline, veins dark brown.

Holotype ♀, NYASALAND: Ruo, 13.iv.1916, deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.). *Allotype* ♂, MOZAMBIQUE: near Spungabera, 21.i.1955 (*B.R.S.*, *P. G.*), in Natal Museum, Pietermaritzburg.

I also refer to this species a female, which is distinctly larger with wing length 3 mm. but otherwise inconspicuous differences, taken in SOUTH AFRICA: Natal, Cathedral Peak area, 1.i.1954 (*B. R. Stuckenberg*), also in Natal Museum.

FIGS. 1–11.—*Agromyza:* (1) *eyeni* sp. n., head; (2) the same, wing; (3) *infusca* sp. n., head; (4) *nigrihalterata* sp. n., head; (5) *oliviae* sp. n., head; (6) *pallidifrons*, sp. n., head; (7) *penniseti* sp. n., leaf-mine on *Digitaria adscendens* Hen.; (8) *susannae* sp. n., head; (9) *uniseta* sp. n., head; (10) *verdensis* sp. n., head; (11) *Agromyza* sp., puparium.



Agromyza spp. (details on facing page).

Agromyza uniseta sp. n.

A large species with a conspicuous bristle on third antennal segment.

Head (fig. 9): frons broad, one and a half times width of eye, not projecting above eye in profile; two strong equal ors, directed upwards; two equal ori, more slender but equal in length to ors, directed inwards; distance between ors one and a half times that between ori; orbital setulae fine, sparse, irregular, extending to upper ors; ocellar triangle not differentiated; lunule broad but flat, forming regular low semicircle; cheeks linear, jowls not prominent but forming distinct angle below eye, at deepest point in ratio 4 : 30 with height of eye; eye length : width ratio 30 : 25; one very strong vibrissa two-thirds length of lower ori; four strong peristomal hairs half length of vibrissa; narrow epistoma present, facial keel low; third antennal segment large, longer than broad, rounded at end, with conspicuous bristle, somewhat slighter than peristomal hairs, forward of and below arista; arista with inconspicuous pubescence, long, equal to length of eye.

Mesonotum: 3 + 1 strong *dc*; third and fourth equal and equidistant before and behind suture; *ia* slightly stronger than *i.pa*; *prsc* unequal, the longer similar to *ia*, the weaker somewhat smaller than *i.pa*; *acr* fairly regular in eight rows, short but conspicuously longer and sparser between second and first *dc*.

Wing: length in male 3·6 mm; veins strong, costa extending to *m1* + *2*, *r-m* at mid-point of discal cell, last segment of *m4* approximately equal to penultimate, in ratio 31 : 32.

Legs: *t2* with two short postero-dorsal bristles.

Abdomen: hairs coarse and long, epandrium small.

Colour: frons matt black behind, becoming slightly lighter, brownish at level of ori; orbits shining-black to upper ori; below, pale brownish-yellow; lunule silvery-grey; jowls matt brown, face black; first antennal segment and surrounding upper area of facial keel brown, second and third segments black; mesonotum black, matt but with distinct subshine; humeral area distinctly brown behind bristle, pleura matt blackish with subshine; upper and hind margin of mesopleuron olive-brown, base of wing similar; squamae dark grey, margins and fringe black; wings hyaline, veins dark, blackish-brown.

Holotype ♂, MADAGASCAR: Ankaratra massif, Marjakatompo forest station, i.1956 (*B. R. Stuckenberg*), in Institut de Recherches Scientifiques de Madagascar.

Agromyza verdensis sp. n.

A small species with red frons.

Head (fig. 10): frons narrow, appearing to be no wider than eye (accurate measurement impossible owing to eyes being sunken), somewhat projecting above eye in profile in lower half; two ors, directed upwards, the lower slightly weaker; two equal ori, similar to lower ors, directed inwards and upwards; distance between ors one and a half times that between ori; orbital setulae relatively long but excessively slender, very sparse, six to eight hairs, with only single hair between ors; ocellar triangle extending to midway between ors; lunule small; cheeks linear, jowls greatly elongated at rear, at deepest point almost one-third height of eye; large epistoma present, height equal to length of third antennal segment; facial keel slight; third antennal segment narrowing distally, flat above, rounded below, with slight pubescence at top.

Mesonotum: 3 + 0 *dc*; second strong, normal, third small and slender, close to second; distance between first and second double that between second and third; *acr* long, half length of third *dc*, in eight rows; *prsc* strong, only slightly shorter than first *dc*; *pa* strong, longer than first *dc*; *i.pa* equal to *ia*.

Wing: length in male 2 mm.; costa extending to *m1* + *2*, first cross-vein at mid-point of discal cell, last segment of *m4* two-thirds length of penultimate.

Legs: *t2* with two postero-dorsal bristles.

Abdomen : hairs not conspicuously long, epandrium small but cerci long.

Colour : frons predominantly reddish, upper orbits down to lower ors blackish ; ocellar triangle black, weakly shining ; lunule grey ; jowls reddish-brown, margins black ; face reddish-brown, median keel black ; antennae reddish-brown, third segment slightly black on upper margin ; mesonotum shining-black, pleura black, somewhat matt ; femora black, tibiae, tarsi lighter brown ; abdomen black, matt with subshine, epandrium black but cerci reddish-brown ; squamal fringe whitish-ochreous, margins not darker ; wings clear hyaline, veins pale brown.

Holotype ♂, Cape Verde Islands : S. Vincente, Monte Verde, 25–29.ix. 1953 (*Panelius*), in Museum Zoologicum Universitatis, Helsinki.

Agromyza sp.

When collecting leaf-mines of *Agromyza penniseti* sp. n. near Dakar in August 1957, I obtained a puparium from the same plant, believed to be *Digitaria adscendens* Henrard, which appears to belong to a different species.

The segmentation is less pronounced, the tubercle band slighter and the anal end of the puparium appears to be bent right over, so that the posterior spiracles arise from the ventral surface (fig. 11). The puparium is orange-red, distinctly lighter than the blackish-red of *penniseti*. Pupation takes place outside the mine.

De Meijere (1940 : 164) also referred to a further species from *Pennisetum purpureum* Schum. It appears therefore that, as in the Palaearctic Region, there are also in the Ethiopian Region a number of *Agromyza* spp. feeding on Gramineae.

3. **Penetagromyza** gen. n.

(from Greek πένης, πένητος, poor, impoverished, and *Agromyza*)

The unique characteristic of this genus, consisting of the single new species described below, is the absence of the post-vertical bristles. The genus has the following combination of characters :

Subcosta running into vein *r1*, which places it in the sub-family Agromyzinae ; halteres dark-brown, prescutellar bristles lacking, in common with *Melanagromyza* Hendel ; 4 + 1 dorso-central bristles, the first pair more widely spaced than subsequent ones, and a conspicuously reddish frons, in common with many species of *Agromyza* Fallén.

Type species : *Penetagromyza aloes* sp. n.

Penetagromyza aloes sp. n.

A leaf-miner on *Aloe petricola* Pole Evans.

Head (fig. 12) : frons exceptionally broad, two and a half times width of eye, strongly projecting above eye in profile from *vt* to base of antennae ; orbits broad, conspicuously differentiated ; one ors, directed upwards and slightly outwards ; three weaker ori directed inwards and forwards, the upper slightly stronger ; all orbitals conspicuously slender and arising from inner margin of orbits ; orbital setulae sparse, in single row, from lower ori to upper ors, directed inwards and upwards ; *pvt* lacking ; ocellar triangle small, rounded at apex, not extending to upper ors, ocellar bristles short, reaching at most to midway between ors ; cheeks broad, forming conspicuously raised band below eye, jowls broad, with cheeks half vertical height of eye, forming straight line below eye, not extended at rear ; vibrissa distinct, equal to lower ori, peristomal hairs minute ; eye oval, small,

length : width ratio 15 : 11 ; lunule large, higher than semi-circle, sunk deep below plane of frons ; with broad furrow at upper margin and enclosed laterally by the broad orbits ; antennae conspicuously small, third segment round ; arista fine, bare, length just less than width of eye ; high, narrow epistoma present, with low facial keel above ; palps slender, scarcely thickened at end.

Mesonotum : 4 + 1 *dc* ; first and second equal, almost twice length of third, fourth and pre-sutural fifth, which are also equal ; second, third and fourth equidistant, distance between first and second somewhat greater ; second and third equidistant behind and before *sa*, fifth at level of humeral bristle ; first pair of *dc* wider apart laterally than remainder ; *acr* short, irregularly in four rows, ending before second *dc* ; *ia* present, equal to third *dc*, several rows of short hairs present in *ia* area ; *i.pa* minute, scarcely longer than *acr* ; *prsc* lacking ; chaetotaxy of pleura normal.

Wing (fig. 13) : length in male 2 mm., in female 2·3 mm. ; costa ending abruptly at *r4* + *5*, second cross-vein absent.

Legs : t2 without postero-dorsal bristles.

Abdomen : hairs on tergites reduced dorsally, at sides normal ; in male epandrium small, normal.

Colour : frons conspicuously reddish ; hind margin of eye and upper orbits continuously black, orbits below ori becoming concolorous with frons ; *vti* on black ground at margin of narrow reddish strip each side of black ocellar triangle ; cheeks, jowls, face and lunule brown ; antennae reddish-brown ; palps brownish ; mesonotum and scutellum largely matt black with slight subshine ; pleura similar, mesopleura with brown margins ; legs predominantly blackish-brown, tarsi distinctly paler, yellowish-brown ; abdomen in male entirely blackish with faint brown undertone, in female tergites more distinctly brown, even yellowish on first and second tergites, with broad black margin ; wings hyaline, veins pale, brownish ; squamae whitish, fringe dark brown.

Holotype ♂, South Africa : Pretoria, vi.1942, bred from leaf-mines on *Aloe petricola* Pole Evans (*H. K. Munro*) ; *allotype* ♀, same data, both in Transvaal Museum, Pretoria. *Paratypes*, 6 ♂, 7 ♀, same data as holotype ; 1 ♀, Pretoria, 26.vii.56 ; one in Zoologisches Museum, Berlin, one in British Museum (Nat. Hist.), two in author's collection.

It should be noted that the original locality of the plant on which the flies breed is Nelspruit, Eastern Transvaal. It seems probable that the flies were imported to Pretoria on the particular plant on which they occur and to which they are confined, although other *Aloe* spp. grow in the vicinity.

The larvae feed singly, although several may occur in the same leaf. A linear mine is formed deep in the thick leaf and pupation takes place immediately below the epidermis. The puparium is whitish and extremely fragile. On emergence a conspicuous, round exit hole is made in the leaf and there is marked brownish discoloration around the pupal area. It is hoped that Prof. Hering will be able to describe the larval characteristics from the remnants of empty puparia which have been sent to him for examination.

4. **Melanagromyza** Hendel

The genus *Melanagromyza* now accounts for 53 per cent. of the known species in the Ethiopian region, in contrast to approximately 5 per cent. of the species in the Palaearctic region. The genus includes leaf-miners, gall-causers, feeders in seeds and internal stem-feeders. Among the former is a unique group of diminutive species, unknown from Europe or N. America, in which the larva forms a shallow, silvery-white epidermal mine. The larva in this group has

a special form of club-shaped mouth-hook with a serrated lower edge, unlike the two pairs of alternating mouth-hooks customary in other Agromyzid larvae.

The epidermal leaf-mines of this group have been recorded on a wide variety of plants and 14 species have been described. The differences between the adults are in all cases slight. It is possible that there are one or more polyphagous species feeding on a number of different families. Séguy (1951) assumes this, reporting that a new species, *Melanagromyza flacourtiae*, is a leaf-miner on plants of no less than 12 widely differing families. This assumption cannot be accepted without further evidence and that so far available suggests that many further distinct species exist. De Meijere (1940) examined the puparia and, in most cases, the mouth-hooks of specimens from some 20 plants collected by Dr. H. Buhr in the Cameroons in 1938 and discovered distinctive differences in the size and number of serrations in the mouth-hooks and in the structure and colour of the puparia. These findings clearly suggest that there are a large number of closely related species in this group, each with its own host-plant. The problem can only be satisfactorily clarified when further material is available and it is possible to study the adult in association with the leaf-mine and puparium.

Experience with bred species shows that morphological differences are frequently minute and only satisfactorily recognisable in a bred series. On the basis of our present inadequate knowledge of the genus in the Ethiopian region, it has not been possible to elaborate a key based solely on the morphology of the adult. The epidermal leaf-miners fall into three groups—(1) costa ending at *r5*, distance between cross-veins equal to length of *r-m*; (2) costa ending at *r5*, distance between cross-veins double length of *r-m*; and (3) costa ending at *m1 + 2*—but within these groups the species cannot be readily differentiated and biological detail has therefore been added to the keys. The group around *M. compositana* is equally difficult to identify and biological information has here also been included.

Many specimens, obtained by sweeping, have been studied which the author is satisfied are distinct from the species to which they run in the key. Detectable differences are, however, so slight that with the individual specimens available it is not possible adequately to characterise a separate species. In such cases, only with bred material will it be justifiable to set up further species.

Genitalia of a number of specimens have been examined but the results were inconclusive. Time has not permitted the detailed study which will be necessary before a satisfactory assessment can be made of the significance of genitalia for the further taxonomic elucidation of this family.

The Ethiopian species can be identified with the aid of the following key:

1	Halteres white	**aberrans***
–	Halteres black or dark brown	2
2	Squamal fringe light, white or ochreous	3
–	Squamal fringe dark, black or brown	29
3	Orbital setulae all distinctly proclinate	4
–	Orbital setulae all reclinate except at most one or two hairs in front; or more irregular in two rows, the inner partially proclinate, the row near eye margin reclinate	6
4	Three dorso-centrals, lunule high and narrow	**stuckenbergi***

* Described as new below.

– Two dorso-centrals 5
5 Frons and orbits conspicuously projecting above eye in profile; jowls greatly elongated, two-fifths height of eye . . . . . **bulbifrons***
– Frons not or scarcely projecting; jowls narrower, at most one-fifth height of eye . . . . . **kikuyuana***
6 Costa terminating at vein *r5*, second cross-vein basad of first . . **insolita***
– Costa extending to vein *m1* + *2*, cross-veins normal 7
7 Lunule high and narrow, one-third width of frons, orbits broad, conspicuous . . . . . **rutshurensis***
– Lunule lower, broader 8
8 Abdomen conspicuously long and narrow, at widest point less than width of mesonotum. Length 2·5 mm., width 0·5 mm. . . **elongata***
– Abdomen normal 9
9 Wings milky-white, second cross-vein nearer first than own length **candidipennis** (Lamb)
– Wings at most hyaline, second cross-vein at least own length removed from first 10
10 Jowls conspicuously elongated, one-quarter height of eye; mesonotum blackish-coppery; wing length 2·7 mm.; three strong, equal ori . **longibucca***
— Jowls narrower, at most one-sixth height of eye 11
11 Mesonotum and abdomen entirely black, largely matt. Small species, wing length 1·2–2·3 mm. 12
— Mesonotum and abdomen with distinct metallic shine, coppery, purple, bluish or green. Large species; if small, wing length 1·9–2·3 mm., then mesonotum and abdomen shining green 15
12 Very small species, wing length 1·2 mm.; wings conspicuously shining **lustralis***
— Larger species, wings hyaline, normal 13
13 Small species, wing length 1·75 mm. 14
— Larger species, wing 2·3 mm.; veins conspicuously pale, yellowish-orange; costal segments 2, 3, 4 in ratio 40 : 7 : 8 . . **galactoptera** Bezzi
14 Mesonotum predominantly matt, greyish, with slight subshine; jowls one-ninth height of eye; costal segments 2, 3, 4 in ratio 34 : 8 : 8 **funebris** (Lamb)
— Mesonotum more shining, blackish; jowls one-sixth height of eye; costal segments in ratio 32 : 6 : 6 . . . . . **decembris***
15 Orbital setulae irregular in two rows; inner row beside eye margin mainly reclinate, outer row mainly proclinate; last segment of vein *m4* short, half length of penultimate; mesonotum shining blackish-green; ocellar triangle conspicuously large, shining blackish. (*Larva in seeds and pods of* Cajanus indicus *L. and* Flemingia rhodocarpa *Bak.*) . . . . . **chalcosoma***
— Orbital setulae predominantly reclinate apart from one or two hairs in front 16
16 Orbital setulae long, extending uniformly from below lower ori to midway between upper ors and *vti*; mesonotum blackish-green; ocellar triangle small, narrow . . . . . **setulifera***
— Orbital setulae extending at most to upper ors 17
17 Mesonotum coppery-golden; orbital bristles conspicuously strong **aurea***
— Mesonotum black, purple, bluish or predominantly greenish . . . 18
18 Abdomen shining purple; wings darkened, brownish 19
— Abdomen metallic bluish, coppery or green 20
19 Mesonotum black; frons projecting above eye in profile; second *dc* behind level of *sa*. Large species, wing 3·25 mm. . . . . **purpurea***

— Mesonotum distinctly purplish; frons not projecting above eye; second *dc* before level of *sa*. Smaller species, wing 2·7 mm. **purpureana***

20 Mesonotum predominantly black 21

— Mesonotum bluish, green or greenish-coppery 22

21 Mesonotum largely shining black, abdomen green; squamal fringe conspicuously white. Small species, wing 2 mm. (*Gall-causer in stems of Papilionaceae*) . . . . . **cunctans** (Meigen)

— Mesonotum predominantly matt; squamal fringe darker, ochreous. Larger species, wing 3 mm. . . . . **nairobensis***

22 Mesonotum distinctly bluish 23

— Mesonotum predominantly green or greenish-coppery 24

23 Frons narrow, equal to width of eye; ocellar triangle short, not reaching lower ors; mesonotum brilliantly shining bluish. Small species, wing 2·4 mm. . . . . **caeruleana***

— Frons broader, one and a half times width of eye; ocellar triangle larger, reaching lower ors; mesonotum more matt. Larger species, wing 2·6 mm. Posterior spiracles of puparium each with 10 buds surrounding a minute horn (fig. 33). (*Biology unrecorded.*) . **lamborni***

24 Very small species, wing 1·9 mm. . . . . **minora***

— Larger species, wing 2·3 mm. or over 25

25 Mesonotum brilliantly shining green. Large species, wing 3·3 mm. **viridissima***

— Mesonotum darker green or more matt 26

26 Jowls one-sixth height of eye; ocellar triangle entirely without hairs around ocellar bristles. Small species, wing 2·5 mm. (*Gall-causer on* Solanum *spp.*) . . . . . **solanidis***

— Jowls narrow, at most one-tenth height of eye; hairs present around ocellar bristles 27

27 Small species, wing 2·3 mm. Mesonotum shining, dark greenish **metallica** (Thomson)

— Larger species 28

28 Arista conspicuously plumose. Large species, wing length 2·8–3 mm. ("*Ex Compositae.*") . . . . . **compositana***

— Arista not so. Smaller species, wing 2·4–2·7 mm. 28*a*

28*a* Mesonotum blackish-green. (*Larva in seeds of* Vigna *spp.*) . . **vignalis***

— Mesonotum brighter, metallic green. (*Leaf-miner on* Gynura sarcobasis *S. Moore.*) . . . . . **gynurae** nom. nov.

29 Costa ending at vein *r5* 30

— Costa extending to vein *m1* + *2* 38

30 Vein *m-m* basad of *r-m*, last segment of *m4* three times length of penultimate . . . . . **curiosa***

— Cross-veins normal, *r-m* basad of *m-m* 31

31 Legs: *t2* with one distinct postero-dorsal bristle 32

— Legs: *t2* without postero-dorsal bristles 33

32 Distance between cross-veins short, equal to length of *r-m* . **nigriclava** Bezzi

— Distance between cross-veins greater, equal to twice length of *r-m*. (*Leaf-miner on* Citrus *sp.*) . . . . . **citri***

33 Arista conspicuously long, equal to vertical height of eye 34

— Arista at most equal to width of eye 36

34 Wing length 1·6 mm. Distance between cross-veins short, equal to length of *r-m*. (*Leaf-miner on* Gossypium *sp.*) . . . . . **gossypii***

— Larger species, wing length 2 mm. 35

35 Distance between cross-veins double length of *r-m* 35*a*

— Distance between cross-veins equal to length of *r-m* 35*c*
35*a* Last segment of vein *m4* appreciably shorter than penultimate . **theae** (Green)
— Last and penultimate segments of vein *m4* equal 35*b*
35*b* *Leaf-miner on* Coffea arabica *L.* . . . . . **coffeae** (Koningsberger)
— *Leaf-miner on* Flacourtia ramontchi *L'Hérit.* . . . **flacourtiae** Séguy
35*c* *Leaf-miner on* Passiflora *spp.* . . . . . **passiflorae** Hering
— *Leaf-miner on* Dioscorea *sp.* . . . . . **dioscoreae** Séguy
36 Shining section of ocellar triangle extends beyond lower ors; frons at level of lower ors less than twice width of eye; squamae grey; veins pale . . . . . **cassinis** Hering
— Shining section of ocellar triangle extends at most to lower ors; frons at level of lower ors twice width of eye; squamae darker, almost black; veins blackish 37
37 Mesonotum with thick brownish-grey dusting, almost entirely matt. Wing length 1·75 mm. . . . . **gymnosporiae** Hering
— Mesonotum with faint blackish-grey dusting, distinctly shining. Larger species, wing 2·1 mm. . . . . **ceratiosicyi** Hering
38 Orbital setulae all proclinate; mesonotum with 4 + 0 *dc* . . . . **wulfi***
— Orbital setulae both proclinate and reclinate or largely upright . . 39
39 Orbital setulae proclinate in area of ors, reclinate below . **beckeri** Hendel
— Orbital setulae all reclinate or upright 40
40 Sub-costal area of wing black . . . . . **nigrimaculata***
— Wings normal 41
41 Frons or orbits conspicuously projecting above eye in profile . . . 42
— Frons or orbits not thus projecting 51
42 Jowls prominent, one-third to one-fifth height of eye 42*a*
— Jowls narrower, one-sixth to one-ninth height of eye 48
42*a* Small species, wing length 1·75 mm. Cheeks broadly projecting at base of antennae; jowls conspicuously prominent, one-third height of eye . . . . . **genata***
— Larger species, wing length at least 2·5 mm. 43
43 Jowls conspicuously projecting in front, three ori . . . . **curvibucca***
— Jowls deepest in centre or at rear 44
44 Large species, wing length 3·3–3·6 mm. Cheeks strongly projecting at base of antennae 45
— Smaller species, wing 2·6–3 mm. 46
45 Orbital setulae upright at ori, small; minute above to lower ors; peristomal hairs conspicuously strong; vibrissa only slightly longer **parvisetula***
— Orbital setulae all reclinate; vibrissa strong, at least twice length of peristomal hairs; jowls deepest in centre . . . . . **ruandae***
46 Third antennal segment with conspicuously long, upcurved pubescence; cheeks scarcely projecting at base of antennae . . **pubescentis***
— Antennal pubescence normal; cheeks projecting broadly at base of antennae and below eye 47
47 Orbits conspicuously widening at base of antennae; broad epistoma present, equal to breadth of third antennal segment . . . **natalensis***
— Orbits not widening anteriorly; epistoma narrow, at most half breadth of third antennal segment . . . . . **mugungae***
48 Large species, wing length in female 3·7 mm.; three ori; arista conspicuously long, equal to vertical height of eye; wings with brownish tinge; mesonotum and abdomen entirely black . **suborbitalis***
— Smaller species, wing in female at most 3·1 mm.; two ori . . . 49

49 Mesonotum and abdomen with greenish-metallic shine; jowls angular; wing length in female 3·1 mm.; arista conspicuously plumose. . . . . **aprilis***
— Mesonotum and abdomen entirely black; jowls rounded. Smaller species, wing length at most 2·4 mm. 50
50 Third antennal segment with long pubescence, arista conspicuously plumose. Wing length 2·4 mm. . . . . **communis***
— Third antennal segment only slightly pubescent, arista bare. Wing length 2 mm. . . . . **dakarensis***
51 Mesonotum with 3 + 0 *dc* . . . . . **kenyensis***
— Mesonotum with 2 + 0 *dc* 52
52 Large species, wing length 2·6–3·2 mm. 53
— Smaller species, wing length at most 2·4 mm. 56
53 Orbital setulae in four rows in front, orbits conspicuously widening anteriorly . . . . . **setulana***
— Orbital setulae in single row 54
54 Squamal fringe black. Wing length 2·6 mm. 55
— Squamal fringe brownish-ochreous. Wing 3 mm. . . . . **nairobensis***
55 Jowls one-twentyfourth height of eye; second *dc* at level of *sa* **dicksoni** Hering
— Jowls one-twelfth height of eye; second *dc* midway between *sa* and *pa* . . . . . **difficilis***
56 Mesonotum predominantly shining black, scarcely matt even when viewed from front 57
— Mesonotum at least partially matt 60
57 Ocellar triangle brilliantly shining black, conspicuously long and narrow, extending beyond lower ors; veins pale brown. Wing length 2·2 mm. . . . . **phaseoli** (Tryon)
— Ocellar triangle smaller, less shining 58
58 Very small species, wing length 1·9 mm.; arista predominantly plumose . . . . . **nicolaudis***
— Larger species, wing at least 2·2 mm.; arista largely bare . . . 59
59 Wings conspicuously darkened, brownish; ori long, equal to lower ors; jowls narrow, one-twelfth height of eye . . . . . **perinetensis***
— Wings hyaline, normal; ori shorter than ors . . . . **spungaberensis***
60 Mesonotum grey, completely matt . . . . . **alustrata***
— Mesonotum distinctly black, more shining 61
61 Jowls deepest in front 62
— Jowls deepest in centre 63
62 Last segment of vein *m4* distinctly shorter than penultimate **crotalariae** Hering
— Last and penultimate segments of vein *m4* equal . . . . . **gracilis***
63 Last segment of vein *m4* substantially shorter than penultimate, in ratio 14:24. Wing length 2·1 mm. . . . . **philocroton** Hering
— Last and penultimate segments of *m4* equal or last segment slightly shorter. Small species, wing 1·6–1·8 mm. 64
64 Mesonotum black. (*Leaf-mine beginning with spiral*) . . **capeneri** Hering
— Mesonotum greyish-black, more matt. (*Leaf-mine without initial spiral*) **vigneae** Séguy

Melanagromyza aberrans sp. n.[1]

Head (fig. 14): frons not projecting above eye in profile, one and a half times width of eye; two ors (both missing on each side of head); two ori directed inwards and upwards;

[1] Subsequent study of bred material, including a male, shows this species to belong to the genus *Ophiomyia*.

orbital setulae short, sparse, irregular ; ocellar triangle elongated, apex extending almost to upper ori ; lunule pronounced, higher than a semicircle ; cheeks narrow but visible as distinct arc below eye, jowls extremely narrow below eye, projecting conspicuously in front ; vibrissa strong, equal to upper ori, peristomal hairs slight ; antennae separated by narrow facial keel (third segment on both antennae missing) ; eye conspicuously round, broad, length : width ratio 16 : 14.

Mesonotum : 2 + 0 *dc*, first twice length of second ; *ia* equal to second *dc*, significantly stronger than *i.pa* ; *acr* short, irregular, in eight rows ; no *prsc* present.

Wing (fig. 15) : length in female 1·9 mm. ; costa extending to *m1* + *2* but weak from *r5* ; *r-m* distad of midpoint of discal cell, last segment of *m4* short, in ratio 12 : 22 to penultimate.

Legs : t2 with two postero-dorsal bristles.

Colour : frons matt greyish-black, jowls, face matt black ; orbits and ocellar triangle weakly shining-black ; mesonotum predominantly shining-black but with matt undertone ; pleura, legs matt black, abdomen more shining ; wings pale, hyaline, veins pale brown ; squamae and fringe conspicuously white ; halteres white.

Holotype ♀, Belgian Congo : Katanga, Biano, 8–11.viii.1931 (*Miss A. Mackie*), deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.).

This species is unique in having white halteres. It is referred to *Melanagromyza* rather than *Agromyza*, since it has no pre-scutellar bristles and only two pairs of dorso-centrals, each pair of which is equidistant laterally. In *Agromyza* the first pair of *dc* are always wider apart than the second and subsequent pairs.

Melanagromyza alustrata sp. n.

A very small, matt grey species.

Head : frons slightly wider than eye, in ratio 8 : 6, not projecting above eye in profile ; two ors directed upwards, the upper slightly stronger ; two equal ori, slightly weaker than lower ors, the upper directed upwards, the lower inwards ; orbital setulae, reclinate, fine and sparse ; ocellar triangle inconspicuous, extending to midway between ors, continuing from apex to lunule as distinct furrow ; orbits scarcely differentiated ; lunule low, flat above, margin not extending above lower ori ; cheeks linear, jowls rounded, deepest in front, in ratio 2 : 15 with height of eye ; vibrissa equal to lower ori, with several weak peristomal hairs ; eye elongated, length : width ratio 15 : 10 ; third antennal segment rounded, with distinct upcurved pubescence above ; arista slightly plumose.

Mesonotum : two *dc*, second two-thirds length of first, at level of *sa* ; *acr* sparse, in six rows in front, between *dc* in four rows, none beyond first *dc*.

Abdomen : covered with coarse hairs.

Wing : length 1·7 mm. ; costa extending to vein *m1* + 2, *r-m* slightly beyond midpoint of discal cell, last segment of *m4* in ratio 13 : 18 with penultimate.

Legs : t2 without differentiated postero-dorsal bristles.

Colour : frons matt greyish black ; ocellar triangle slightly more blackish, weakly shining ; base of orbital bristles weakly shining, orbits otherwise uniform with frons ; mesonotum predominantly matt grey, faint shine visible when viewed from behind ; abdomen shining, black ; pleura matt grey, legs greyish-black, faintly shining ; wings hyaline, veins dark ; squamae dark grey, fringe black.

Holotype ♂, Cape Verde Islands : S. Tiago, Lagoa, 15.ii.1954 ; *allotype* ♀, same data (*Lindberg*), both in Museum Zoologicum Universitatis, Helsinki. *Paratypes*, 11 ♂, 9 ♀, Cape Verde Islands : S. Tiago, Maio, Nicolau, S. Antão, Boavista ; 14 in Museum Zoologicum Universitatis, 6 in author's collection.

Melanagromyza aprilis sp. n.

Head (fig. 16) : frons almost one and a half times width of eye, in ratio 14 : 10, narrowly but distinctly projecting above eye in profile ; two ors and two ori, all equidistant ; ors directed upwards, ori partially inwards (all strong but broken and relative length not ascertainable); orbital setulae fine, fairly numerous, from below lower ori to upper ors ; ocellar triangle distinct, apex extending to lower ors ; lunule large, higher than semicircle, upper margin forming flat arc, distinctly furrowed in centre ; orbits broad, widening distinctly at lunule and then obliquely narrowing to eye margin ; cheeks forming distinct narrow ring from base of antennae around lower margin of eye, jowls forming distinct angle below centre of eye, one-sixth height of eye ; eye conspicuously longer than broad, in ratio 24 : 16 ; third antennal segment large, round, with upcurved pubescence ; arista conspicuously plumose, length slightly less than vertical height of eye ; facial keel low, inconspicuous.

Mesonotum : two strong *dc*, second at level of *sa* (remaining chaetotaxy of mesonotum indeterminable, largely destroyed).

Wing : length in female 3·1 mm. ; costa extending strongly to *m1* + *2*, *r-m* at midpoint of discal cell, last segment of *m4* in ratio 24 : 30 with penultimate.

Legs : *t2* with one strong postero-dorsal bristle.

Colour : frons matt black, ocellar triangle and orbits moderately shining ; mesonotum largely shining black, with faint greenish metallic sheen ; abdomen shining blackish-green ; wings hyaline, slightly dark, veins brown ; squamae grey, margins black, fringe dark brown.

Holotype ♀, Belgian Congo : Rutshuru, 7.iv.1937 (*Mission Prophylactique*), in Musée Royal du Congo Belge, Tervuren.

Melanagromyza aurea sp. n.

A species characterised by the golden sheen of the mesonotum and conspicuously strong bristles of head and thorax.

Head : frons slightly wider than eye, ratio 13 : 11 ; eyes abnormally broad, length : width ratio 22 : 18 ; frons not projecting above eye in profile ; two strong, equal ors directed upwards ; two strong but weaker ori, the upper directed inwards and upwards, the lower predominantly inwards ; orbital setulae minute, abnormally small, extending sparsely from before lower ori to upper ors ; ocellar triangle large, extending to midway between lower ors and upper ori ; lunule large, reaching level of upper ori ; cheeks linear, jowls very narrow, one-eleventh height of eye ; third antennal segment round, with conspicuous pubescence, arista long, slightly longer than vertical height of eye, conspicuously but finely plumose.

Mesonotum : 2 + 0 *dc*, second two-thirds length of first, at level of *sa* ; *ia* slightly weaker than second *dc* ; no *i.pa* ; *acr* fine, numerous, in twelve rows, only three hairs at level of first *dc*.

Wing : length in male 2·5 mm. ; costa strong, extending to *m1* + 2, segments of *m4* in ratio 3 : 2 ; all veins strong and well-defined.

Legs : *t2* with two strong postero-dorsal bristles.

Colour : frons matt black, ocellar triangle and orbits conspicuously shining ; lunule pale, grey ; mesonotum with characteristic golden-coppery sheen but somewhat matt; scutellum more greenish ; abdomen shining green ; squamae dirty white, margins orange fringe white.

Holotype ♂, Belgian Congo : Terr. de Banningville, riv. Bas-Kwango, iv.1945 (*Dr. Fain*), in Musée Royal du Congo Belge, Tervuren.

I refer to this species a second specimen, a female, from the Belgian Congo : Bassin Lukuga ; and also two females from Natal : Pietermaritzburg and Grahamstown, in the Natal Museum, Pietermaritzburg.

Melanagromyza beckeri Hendel, 1923

South Africa : Pretoria, bred from leaf-mine on *Sonchus oleraceus* L. (Hering, 1957).

Southern Rhodesia : Rhodes-Inyanga National Park, 13.i.1955 (*B. R. Stuckenberg*).

Melanagromyza bulbifrons sp. n.

A large species with conspicuously projecting frons.

Head (fig. 17) : frons wide, twice width of eye ; in profile increasingly projecting above eye from apex of ocellar triangle anteriorly to base of antennae ; orbits broad, significantly widening anteriorly, at base of antennae greatly projecting above eye, one-fifth width of eye ; antennae completely sunk within continuous projection formed by lower part of frons, orbits and cheeks, third segment small, rounded, with conspicuous pubescence, arista long, equal to width of eye ; lunule small, sunk below plane of frons ; ocellar triangle long, tapering, extending to slightly beyond upper ors ; two ors, upper at level of ocellar bristles, lower at apex of ocellar triangle ; two ori, lower conspicuously forward, at inner margin of orbital projection above antennae, upper widely separated, midway between lower ori and upper ors ; orbital setulae long and numerous, increasing in number anteriorly, thick on lower, projecting part of orbits, all proclinate ; jowls greatly elongated, two-fifths height of eye ; large epistoma present, equal in length to widest part of jowl.

Wing : length in female 3·25 mm. ; costa extending to *m1* + *2*, *r-m* at midpoint of discal cell, last segment of *m4* four-sevenths length of penultimate.

Colour : head entirely matt brownish-black, ocellar triangle moderately shining ; mesonotum and abdomen shining bluish-black ; squamae white, with white margins and fringe.

Holotype ♀, Nyasaland : Mt. Mlanje, 6.xii.1912 (*S. A. Neave*), deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.).

Melanagromyza caeruleana sp. n.

Head : frons narrow, equal to width of eye, not projecting above eye in profile ; two long, equal ors directed upwards ; two ori directed inwards and slightly upwards, the lower somewhat weaker and the upper correspondingly weaker than lower ors ; orbital setulae fine, sparse, relatively long, from before lower ori to upper ors ; ocellar triangle narrow, not reaching to lower ors ; lunule slightly higher than semicircle ; cheeks linear, jowls angular, deepest in centre, one-sixth height of eye ; eye length : width ratio 18 : 12 ; third antennal segment slightly longer than broad, with slight upcurved pubescence, arista conspicuously plumose, long, equal to vertical height of eye.

Mesonotum : 2 + 0 *dc*, second little more than half length of first, at level of *sa* ; *ia* somewhat shorter than second *dc* ; *i.pa* similar to *acr* ; *acr* in eight rows, two hairs only at first *dc*.

Wing : length in female 2·4 mm ; costa extending to vein *m1* + *2*, *r-m* slightly beyond midpoint of discal cell, last segment of *m4* in ratio 15 : 26 with penultimate.

Colour : frons matt black ; ocellar triangle distinctly shining black, orbits less so ; mesonotum strikingly shining bluish, abdomen similar ; wings hyaline, veins dark-brown squamae whitish, margins only slightly darker, fringe white.

Holotype ♀, Belgian Congo : Ruanda, contref. Est Muhavura, 2100 m., 28.i.53 (*P. Basilewsky*), in Musée Royal du Congo Belge, Tervuren.

I also refer to this species a male from Belgian Congo : Urundi (Mosso), Makoroukwe, 1450 m., also at Tervuren.

Melanagromyza candidipennis (Lamb), **comb. nov.**

Agromyza candidipennis Lamb, 1912.

Seychelles (*Lamb*) ; Tanganyika (*Zerny*), one female in Naturhistorisches Museum, Vienna ; Kenya (*Turner*), one female in British Museum (Nat. Hist.).

This species is immediately recognisable by the characteristic milky-white wings and the proximity of the two cross-veins, which are separated by less than the length of *r-m*. The wing length is 2·3 mm. Mesonotum and abdomen are shining greenish-black.

Melanagromyza capeneri Hering, 1957

South Africa : Natal, Umgababa, bred from upper surface linear mine, beginning with characteristic reddish spiral. Host plant not known. Holotype in Transvaal Museum, Pretoria.

This species closely resembles *M. vigneae* Séguy, but the mesonotum is distinctly blacker and more shining.

Melanagromyza cassinis Hering, 1957

South Africa : Cape Province, Zuurberg Pass, bred from leaf-mines on *Cassine sphaerophylla* (Presl.) O. Ktze. Type in Transvaal Museum, Pretoria.

Melanagromyza ceratiosicyi Hering, 1957

South Africa : Cape Province, Alexandria (*Langebos*), bred from leaf-mines on *Ceratiosicyos ecklonii* Nees. Type in Transvaal Museum, Pretoria.

Melanagromyza chalcosoma sp. n.

Head : frons slightly less than one and a half times width of eye, not or scarcely projecting above eye in profile, though orbits well defined ; two strong ors normally equal, reclinate ; two equal ori, inverted, strong but weaker than ors ; orbital setulae irregularly in two rows from before lower ori to upper ors ; inner row beside eye margin mainly reclinate, outer row mainly proclinate ; ocellar triangle large, pointed at apex, extending to upper ori or beyond ; lunule below plane of frons, higher than a semicircle, extending normally to upper ori ; cheeks linear, jowls narrow, deepest in front, together one-ninth height of eye ; eye large, longer than broad, in ratio 28 : 20 ; third antennal segment large, with moderate pubescence, slightly broader in front, otherwise rounded, arista pubescent, longer than width of eye.

Mesonotum : 2 + 0 *dc*, second little more than half length of first, at level of *sa* ; *ia* strong, equal to second *dc* ; *i.pa* weak, scarcely longer than *acr* ; *acr* thick in ten rows, extending irregularly in six rows to first *dc*.

Wing : length 2·8 mm. ; costa extending strongly to vein *m1* + 2, *r-m* at midpoint of discal cell, last segment of *m4* short, half length of penultimate or slightly longer, up to ratio 20 : 35.

Legs : t2 with two strong bristles.

Colour : frons dark, matt-brown, orbits slightly shining ; ocellar triangle distinctly shining, black to greenish ; lunule grey ; mesonotum shining blackish-green, abdomen bright coppery-green ; wings hyaline, veins pale brown, distinctly yellowish at base ; squamae white, with yellowish-brown borders and white fringe ; puparium 3·1 mm. × 1·8 mm., orange-brown ; posterior spiracular processes consisting of two broad-based protuberances, each surmounted by an ellipse of eight to nine indistinct buds, which partially enclose the scar representing the horn present in other species (fig. 18).

Holotype ♂, NYASALAND : Namiwawa, 1915, bred (*C. Mason*). *Allotype* ♀, same data. *Paratypes :* 1 ♂, same data ; 1 ♂, 28.xi.1923, 1 ♂, 1 ♀, 20.xii. 1920 (bred) (*C. Hargreaves*), all in British Museum (Nat. Hist.).

There are further specimens in the British Museum which I refer to this species :

S. NIGERIA : bred from seeds of " pigeon pea."

UGANDA : bred from seeds of *Flemingia rhodocarpa* Bak. and from pods of *Cajanus indicus* L.

ZANZIBAR : bred from pods of " inbozi bean ".

This species is closely related to the species occurring in India as a pest on *Cajanus* and other leguminous crops, which has been referred to *Agromyza* (*Melanagromyza*) *obtusa* Malloch (Vengopal, 1954).

I have examined the type of *obtusa*, kindly obtained for me by Prof. Hering from the Budapest Museum, and have been able to establish that the Indian species has been correctly referred to this species and also that it is distinct from *chalcosoma*. The latter is readily distinguishable by its blacker, less greenish mesonotum, by the smaller ocellar triangle, which is pointed and not blunt at the apex, and by the puparium having eight, not twelve, buds on the posterior spiracles.

In order to clarify this group further, I have also examined the types of *Melanagromyza weberi* de Meijere, 1922, bred from pods of *Flemingia* sp. in Java. Comparison with *obtusa* shows the two to be identical. The synonymy of this species is therefore :

Melanagromyza obtusa (Malloch), Hennig, 1941.
Agromyza obtusa Malloch, 1914.
Melanagromyza weberi de Meijere, 1922, **syn. nov.**

Melanagromyza citri sp. n.

The single available specimen, bred from *Citrus* sp., is unfortunately lacking its head but the remainder of the insect is in perfect condition and can be satisfactorily described as a new species.

Mesonotum : two *dc*, the second at level of *sa* and two-thirds length of first ; *pa* longer than first *dc*, *i.pa* small, twice length of *acr*, equal to *ia* ; *acr* in eight rows at second *dc*, thinning behind, only two hairs at level of first *dc*.

Wing : length in female 1·6 mm. ; costa extending only to *r5*, *r-m* at anterior third of discal cell, last and penultimate segments of *m4* equal.

Legs : t2 with one weak postero-dorsal bristle.

Colour : mesonotum brownish-black, weakly shining but distinctly matt ; abdomen slightly denser black, more shining ; legs uniformly brownish-black ; wings hyaline, veins pale ; halteres dark brown, distinctly light at top ; squamae grey, margins black, fringe blackish.

Holotype ♀, Sierra Leone : Njala, emerged 5.i.1934, bred from leaf-mine on *Citrus* sp. (*F. Hargreaves*), deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.).

Melanagromyza coffeae (Koningsberger)

Oscinis coffeae Koningsberger, 1879.
Melanagromyza coffeae Hering, 1940, **syn. nov.**

This species belongs to what is undoubtedly a large group of leaf-miners in which the costa ends at vein *r4* + *5* and the squamal fringe is black.

The original description by Koningsberger inadequately defines the species. Hering has subsequently redescribed it in detail (1940), but in overlooking Koningsberger's work the name used represents a primary homonym. *Melanagromyza coffeae* Hering must thus be synonymised with *Melanagromyza coffeae* (Koningsberger).

The species can be briefly characterised as follows :

Frons not projecting above eye in profile, two ors and two ori, the upper directed upwards, the lower inwards ; arista conspicuously long, equal to vertical height of eye ; wing length 2 mm., costa extending to *r4* + *5*, distance between *r-m* and *m-m* equal to twice length of *m-m* ; an entirely black species, mesonotum largely shining, abdomen more so ; squamae grey, fringe black.

The larva forms an upper surface epidermal leaf-mine on *Coffea arabica* L. and the puparium has been described by de Meijere (1934). The puparium remains in the leaf.

Kenya : Lower Kabete and Nairobi ; Tanganyika : Amani. The species occurs widely in Java (de Meijere, 1934 : 251) and there are specimens in the British Museum (Nat. Hist.) from India : Mysore.

Melanagromyza communis sp. n.

Head : frons twice width of eye, distinctly projecting above eye in profile ; two equal ors directed upwards, two similar ori directed inwards ; orbital setulae fine but distinct, reclinate, from below lower ori to upper ors; ocellar triangle small, apex extending to lower ors ; lunule small, forming semicircle ; orbits slightly widening anteriorly ; cheeks visible as narrow band below eye, not projecting at base of antennae, jowls conspicuous, rounded, deepest in centre, one-sixth height of eye ; vibrissa weak, distinctly slighter and shorter than lower ori ; third antennal segment slightly longer than broad, with conspicuous upturned pubescence which is longer than width of base of arista, arista conspicuously plumose, slightly longer than height of eye ; eye largely round, height : width ratio 18 : 15.

Mesonotum : 2 + 0 *dc*, second at level of *sa*, two-thirds length of first ; *ia* slightly weaker than second *dc*, *i.pa* relatively strong, three times length of *acr* ; *acr* in eight rows, a few hairs beyond first *dc*.

Wing : length in male and female 2·4 mm. ; costa extending to *m1* + *2*, *r-m* distinctly beyond mid-point of discal cell, last segment of *m4* variable, half-length of or up to ratio 18 : 26 with penultimate.

Colour : frons matt black, ocellar triangle and orbits weakly shining ; mesonotum black, largely shining when viewed from behind, more matt, greyer when viewed from the front ; abdomen shining-black ; wings clear, veins dark-brown to black ; squamae grey, margin black, fringe brownish-black.

Holotype ♀, Belgian Congo: Rutshuru, 7.iv.1937 (*Mission Prophylactique*), in Musée Royal du Congo Belge, Tervuren. *Allotype* ♂, i.1934, Rutshuru. *Paratypes:* 2 ♀, same data as allotype, one in Musée Royal du Congo Belge, one in author's collection.

Specimens referable to this species have also been examined from Belgian Congo: Parc National Albert and Bambesa, in the Musée Royal du Congo Belge; and from Tanganyika in the Museum für Naturkunde, Stuttgart.

Melanagromyza compositana sp. n.

Head: frons equal to width of eye, not projecting above eye in profile; two strong equal ors directed upwards, two weaker ori normally inverted; orbital setulae fine but long, all reclinate, from below lower ori to upper ors; ocellar triangle large, extending to midway between lower ors and upper ori; lunule forming semicircle; length : width eye ratio 27 : 18; cheeks linear, jowls rounded, narrow, one-twelfth height of eye, antennae separated at base by narrow facial keel, third antennal segment rounded at end, slightly longer than broad, with slight pubescence at end, arista long, ratio to eye width 24 : 18, conspicuously plumose.

Mesonotum: 2 + 0 *dc*, second two-thirds length of first, at or slightly behind level of *sa*; *ia* weaker than second *dc*, *i.pa* scarcely longer than *acr*; *acr* in eight rows, extending in four rows to first *dc*.

Wing: length 3 mm.; costa extending to vein *m1* + *2*, *r-m* slightly distad of midpoint of discal cell, last segment of *m4* in ratio 18 : 32 with penultimate.

Legs: *t2* with two strong posterodorsal bristles.

Colour: frons matt black, ocellar triangle and orbits shining, blackish; mesonotum largely shining, but matt from front; uniformly greenish with slight coppery subshine; abdomen shining, coppery-greenish; veins pale brown, base of wing conspicuously light brownish-yellow; squamae greyish-white with pale brown margins, fringe whitish.

Holotype ♀, Kenya: Naivasha, iv.1937 (*H. J. A. Turner*); *allotype* ♂ and 1 ♂, 2 ♀ *paratypes*, same data, all "ex Composite 1", deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.); 2 ♀ paratypes in author's collection.

It is not established whether this species is a leaf-miner or internal stem-borer. It occurs on a number of genera of the Compositae and appears to be widespread throughout the Ethiopian region.

Further specimens are referred to this species as follows:

Kenya: Ngong (*Van Someren*), bred from "*Senecio* 532", 7 specimens.
Nairobi (*H. J. A. Turner*), bred from "Composite 501", 6 specimens.
Kabete (*MacInnes*), 1 specimen.

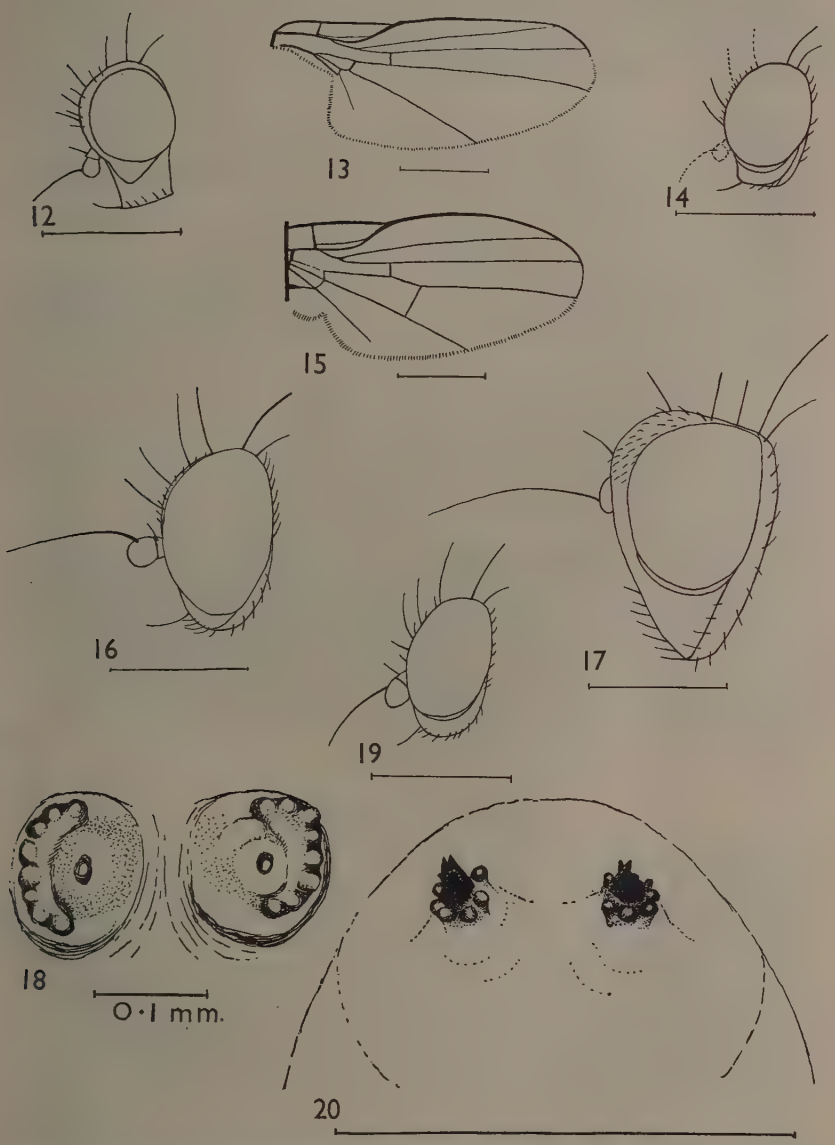
Nyasaland: Maiwale (*W. A. Lamborn*), bred from Compositae sp., 34 specimens.

Mauritius: Réduit (*A. Moutia*), bred from *Bidens pilosa* L., 1 specimen.

Cape Verde Islands: S. Tiago, S. Antão, S. Vincente (*Lindberg*), 50 specimens.

Belgian Congo: Katanga (*J. Ogilvie*), 2 specimens.

There are slight differences between many of these specimens and the type series. The conspicuous yellowing of the wing base is lacking and the veins are generally darker; the Cape Verde series, in particular, are smaller, with



FIGS. 12–20.—(12–13) *Penetagromyza aloes* sp. n. (12) head; (13) wing. (14–20) *Melanagromyza*: (14) *aberrans* sp .n., head; (15) the same, wing; (16) *aprilis* sp. n., head; (17) *bulbifrons* sp. n., head; (18) *chalcosoma* sp. n., posterior spiracles of puparium; (19) *crotalariae* Hg., head; (20) *cunctans* (Mg.), posterior spiracles of puparium.

wing length between 2·5 and 2·7 mm.; there is some variation in colour of the mesonotum. It is unfortunate that of the bred specimens the puparium has in no single case been preserved. Clarification of this species will only be possible when larvae or puparia can also be studied.

Melanagromyza crotalariae Hering, 1957

South Africa: Natal, bred from upper surface linear mines on *Crotalaria capensis* Jacq. Holotype in Transvaal Museum, Pretoria.

Uganda: Kampala, 3 specimens, in British Museum (Nat. Hist.), bred from leaf-mines on *Crotalaria juncea* L.

The species is recognisable by the characteristically rounded jowls, which are deepest in front (fig. 19). The illustration has been prepared from one of the specimens from Uganda, as in both holotype and paratype the head is badly deformed.

Melanagromyza cunctans (Meigen)

Belgian Congo: Parc National Albert, 3 specimens, in Musée Royal du Congo Belge, Tervuren.

Uganda: bred from stems of *Crotalaria* ? *juncea* L., in British Museum (Nat. Hist.).

South Africa: Transvaal (doubtful), also in British Museum (Nat. Hist.).

This species was redescribed by Hendel (1936) and has recently been discussed further by Spencer (1958). It appears to be widespread in the Palaearctic and Ethiopian Regions and has also been recorded in India.

The larva feeds in the stem of several genera of Papilionaceae and the puparium has a characteristic arrangement of six buds on the posterior spiracular process (fig. 20).

Bred from "pea-stems", India: Pusa.

Melanagromyza curiosa sp. n.

An aberrant species with vein *m-m* well basad of *r-m*.

Head (fig. 21): frons only slightly wider than eye, in ratio 12 : 10, not projecting above eye in profile; two equal ors directed upwards, the upper also distinctly outwards; two weaker ori directed inwards and slightly upwards; distance between the two ors and upper ori equal, double that between ori; orbital setulae reclinate, numerous, from lower ori to upper ors; ocellar triangle large, conspicuous, extending to lower ors; lunule low, flat above, sunk below plane of frons; orbits well-defined, narrowing at base of antennae; cheeks slightly projecting below eye, jowls forming conspicuous bulge below centre of eye, one-seventh height of eye; eye scarcely longer than broad, ratio 20 : 18; antennae set deep into head, third segment broader than long, arista bare, slightly shorter than width of eye.

Mesonotum: 2 + 0 *dc*, second at level of *sa*; *ia* strong; *acr* abnormally long and coarse, in eight rows, only two hairs between first pair of *dc*; the hair beyond the second *dc* conspicuously long and might be considered a small third *dc*.

Wing (fig. 22): length in female 2·3 mm.; costa extending to vein *r5*, *m-m* basad of and own length removed from *r-m*, last segment of *m4* three times length of penultimate.

Legs: *t2* with two strong postero-dorsal bristles.

Colour : an all black species ; frons matt, ocellar triangle conspicuously, orbits weakly shining ; mesonotum and abdomen entirely shining-black ; wing hyaline, veins strong, black, more brown at wing base ; squamae greyish-brown, fringe brownish-black.

Holotype ♀, Belgian Congo : N. Lac Kivu, Rwanki, xii.1951 (*J. V. Leroy*), in Musée Royal du Congo Belge, Tervuren.

This species has similar wing venation to the very much smaller *insolita* sp. n. which has been placed in the first half of the key (couplet 6), in view of its white squamal fringe.

Melanagromyza curvibucca sp. n.

Head (fig. 23) : frons one and a half times width of eye, narrowly projecting above eye in profile from vertex to base of antennae ; two ors, closely adjoining, separated only by distance equal to diameter of their basal pits, the upper directed upwards and outwards, the lower upwards and inwards ; three ori directed inwards, the upper equidistant between upper ors and mid ori ; orbital setulae all reclinate, long and uniformly thick from below lower ori to lower ors, only a single hair above ; ocellar triangle broad, short, extending to lower ors ; lunule broad, higher than a semicircle, jowls conspicuously elongated in front, rounded, projecting below third antennal segment, one-quarter height of eye ; cheeks slightly projecting at base of antennae, continuing as narrow ring below eye.

Mesonotum : 2 + 0 *dc*, second long (broken), at level of *sa* ; *ia* strong but weaker than second *dc*, *i.pa* slight ; *acr* coarse, irregularly in eight rows, a few hairs beyond first *dc*.

Wing : length in male 3·1 mm. ; costa extending to vein *m1* + 2 ; *r-m* at mid-point of discal cell, last and penultimate segments of vein *m4* in ratio 20 : 32.

Colour : frons blackish-brown, ocellar triangle moderately shining black ; jowls dark brown ; mesonotum shining-black, with slight greenish tinge ; abdomen moderately shining, greenish-coppery ; wings slightly darkened, veins dark brown ; squamae grey, fringe black.

Holotype ♂, Belgian Congo : Nyiragungo, 2300 m., 1933 (*De Wulf*), in Musée Royal du Congo Belge, Tervuren.

Melanagromyza dakarensis sp. n.

Head (fig. 24) : frons twice width of eye, projecting as uniform narrow ring above eye in profile ; two ors, the upper stronger and directed upwards and outwards, the lower directed inwards and upwards ; two equal ori, small and weak, two-thirds length of lower, orbital setulae strong, conspicuous, all reclinate, from before lower ori to upper ors ; orbits not greatly differentiated ; ocellar triangle short, extending only to upper ors, furrow continuing down centre of frons to margin of lunule ; lunule small, sunk below plane of frons ; cheeks linear, jowls rounded, deepest in centre, one-seventh height of eye ; eye conspicuously round, length : width ratio 18 :15 ; third antennal segment broadening distally, with fine pubescence, arista bare.

Mesonotum : 2 + 0 *dc*, second two-thirds length of first, at level of *sa* ; *ia* slightly weaker than second *dc* ; *i.pa* twice length of *acr* ; *acr* short in eight rows, two rows only at level of first *dc*.

Wing (fig. 25) : length in female 2 mm. ; costa extending to *m1* + 2, *r-m* at mid-point of discal cell, last segment of *m4* in ratio 15 : 19 with penultimate.

Legs : t2 with one well-defined postero-dorsal bristle.

Colour : frons matt black ; ocellar triangle and orbits weakly shining ; mesonotum largely shining-black, with matt undertone ; abdomen shining-black ; wings clear hyaline veins dark ; squamae dark grey, margin and fringe black.

Holotype ♀, SENEGAL: Dakar, 2.viii.1957 (*K. A. Spencer*), in author's collection.

This species resembles *M. communis* sp. n., but is distinguishable by the smaller size, less projecting frons, stronger upper ors and bare arista.

Melanagromyza decembris sp. n.

Head: in the single specimen available the eyes have sunk and it is therefore not possible to determine the frons to eye ratio, but the frons appears substantially wider than the eye, not projecting above it in profile; two equal ors directed upwards; two ori, the upper directed upwards and equal to ors, the lower directed inwards, weaker; ors and ori all equidistant; orbital setulae relatively long, from lower ori to upper ors; ocellar triangle extending only to lower ors; lunule small, forming semicircle; cheeks distinct below eye in front, jowls broadest in front, one-sixth height of eye.

Mesonotum: 2 + 0 *dc*, second two-thirds length of first, slightly before *sa*; *ia* distinct but weaker than second *dc*; *i.pa* twice length of *acr*; *acr* fine, in eight rows, terminating before second *dc*.

Wing (fig. 26): length 1·75 mm.; costa ending at *m1* + *2* but weak beyond vein *r5*, the two segments of *m4* equal; squamal fringe fine.

Colour: head entirely black, vertical triangle and orbits inconspicuously shining; mesonotum somewhat shining, black, but with distinct matt undertone; abdomen black, more shining; wings hyaline, normal, veins pale brown; squamae dirty white, fringe white.

Holotype ♂, CAPE VERDE ISLANDS: Nicolau, Rib. Bravo, 6–19.xii.1953 (*H. Lindberg*), in Museum Zoologicum Universitatis, Helsinki.

This species closely resembles *M. funebris* (Lamb) from the Seychelles, but can be distinguished by the more shining mesonotum, the weaker costa beyond vein *r5* and the broader jowls.

Melanagromyza dicksoni Hering, 1957

SOUTH AFRICA: Durban, bred from linear mines on unidentified plant, possibly *Bosquiea* sp.

This species closely resembles *Melanagromyza difficilis* sp. n. It is distinguishable by the less shining mesonotum, absence of prominent cheeks below the eye and slightly darkened wings. The head (fig. 27) in the only available specimen is partially deformed.

Melanagromyza difficilis sp. n.

Head (fig. 28): frons equal to width of eye, longer than broad, not projecting above eye in profile; two ors, upper slightly longer; two weaker, equal ori, the upper directed upwards, the lower inwards; orbital setulae long, reclinate, from lower ori to upper ors; ocellar triangle small, tapering, not reaching lower ors; lunule large, slightly higher than semicircle; orbits not pronounced; cheeks just visible at base of antennae, broadly projecting below eye, jowls relatively broad in ratio 3 : 24 with height of eye; eye large, elongated, height: width ratio 24 : 16; third antennal segment slightly broadening distally, inconspicuously pubescent; arista bare, short, in ratio 15 : 24 with height of eye.

Mesonotum: 2 + 0 *dc*, second slightly behind *sa*; *acr* coarse in eight rows, six rows extending almost to first *dc*.

Wing: length in female 2·6 mm.; costa extending to *m1* + *2*, *r-m* distinctly beyond midpoint of discal cell, last segment of *m4* in ratio 16 : 24 with penultimate.

Legs : *t2* apparently without postero-dorsal bristle.

Colour : frons matt black, ocellar triangle and orbits only weakly shining ; mesonotum predominantly shining-black with only slight dusting ; abdomen brilliantly shining-black ; wings hyaline, veins dark-brown ; squamae grey, fringe brownish-black.

Holotype ♀, MOZAMBIQUE : near Spungabera, 21.i.1955 (*B. R. S. and P. G.*), in Natal Museum, Pietermaritzburg.

This species closely resembles *M. dicksoni* Hering. It can be distinguished by the more shining mesonotum and the prominent cheeks, which in *dicksoni* are linear.

Melanagromyza dioscoreae Séguy, 1951

MADAGASCAR : Tananarive, Tsimbazaza.

An epidermal leaf-miner, which is stated to have been bred from the following host-plants : *Dioscorea* sp., *Pachypodium rutenbergianum* Vatke, *Kalanchoe* ? *aliciae* Hamet, *Cassia occidentalis* L., *Clitoria* sp., *Duranta plumieri* Jacq.

The leaf-mine on *Pachypodium* is figured by Paulian (1953).

The species belongs to the group where the costa extends only to vein *r5*, and the cross-veins are separated by a distance equal to vein *r-m*.

More material, in particular leaf-mines and larvae or puparia, is necessary before it can be established whether this is a single polyphagous species or whether, as seems more probable, a closely-related species group is involved.

Melanagromyza elongata sp. n.

A large species characterised by its conspicuously long and narrow abdomen.

Head (fig. 28*a*) : frons at foremost ocellus wider than eye, in ratio 15 : 12, not projecting above eye in profile ; two ors directed upwards (lower sometimes inwards) ; two equal ori directed inwards ; orbital setulae short and sparse, at front proclinate, at rear upright or reclinate ; ocellar triangle large, conspicuous, extending to mid-ori ; orbits differentiated, well-defined ; cheeks linear, jowls deepest in centre, one-seventh height of eye ; eye length : width ratio 26 : 20 ; arista distinctly plumose, length equal to eye width ; third antennal segment large, round, with conspicuous pubescence.

Mesonotum : 2 + 0 *dc*, second short, scarcely half length of first, before level of *sa* ; *ia* equal to second *dc* ; *i.pa* minute ; *acr* thick, in ten rows, ceasing before first *dc*.

Wing : length 3·2 mm. ; costa extending to *m1* + 2, *r-m* at midpoint of discal cell, last segment of *m4* short, in ratio 20 : 35 with penultimate.

Legs : *t2* with two postero-dorsal bristles.

Abdomen : conspicuously long and narrow, widest point at second tergite substantially narrower than mesonotum, covered with coarse hairs ; in female cone of ovipostor slightly longer than width of sixth tergite. Length 2·5 mm. (including protracted ovipositor) maximum width 0·5 mm.

Colour : frons dark-brown, lunule light-grey, ocellar triangle shining-black. (In two specimens orbits and vertical triangle conspicuously pale, yellowish-brown but this appears to be due to incomplete development of the pigmentation.) Mesonotum shining, bluish-black ; squamae yellowish-white, fringe golden-whitish ; abdomen brown with distinct bluish-black shine, last tergite with broad yellow margin, ovipositor shining-black.

Holotype ♀, S. RHODESIA : Salisbury, 2.i.1914 ; *paratypes*, 1 ♀, 1 sex indet. (abdomen missing), same data (*Dept. Agriculture*), in British Museum (Nat. Hist.).

Melanagromyza flacourtiae Séguy, 1951

Madagascar : Tananarive, Tsimbazaza.

An epidermal leaf-miner which is stated to have been bred from the following plants :

Flacourtia ramontchi L'Hérit., *Cryptostegia madagascariensis* Boj., *Mascarenhasia arborescens* A. D. C., *Dioscorea* sp., *Cassia laevigata* Willd., *Maesa emirnensis* A. D. C., *Bougainvillea* sp., *Passiflora edulis* Sims., *Pittosporum stenopetalum* Baker, *Coffea* sp., *Mussaenda arcuata* Poir., *Camelia thea* Link, *Solanum giganteum* Jacq. and *S. indicum* L.

The species belongs to the group where the costa extends only to vein *r5* and the cross-veins are separated by a distance double that of vein *r-m*.

Leaf-mines on *Cryptostegia*, *Pittosporum*, *Maesa* and *Bougainvillea* are figured by Paulian (1953).

In the opinion of the author it is doubtful whether this is, in fact, a single polyphagous species feeding on hosts of such widely differing families. The problem can only be clarified when further material, in particular leaf-mines and larvae or puparia, is available for detailed study.

Examination of the specimens bred from *Solanum* spp. shows them to be an *Ophiomyia* sp. n., which will be described later, together with other recent material from Madagascar.

Melanagromyza funebris (Lamb), **comb. nov.**

Agromyza funebris Lamb, 1912.

Head : frons slightly less than eye width, slightly projecting above eye in profile ; two ors directed upwards ; two ori, the upper predominantly upwards, the lower weaker and directed inwards ; orbital setulae fine, sparse, reclinate, from lower ori to upper ors ; ocellar triangle extending to lower ors ; cheeks prominent below eye in front, jowls narrow, one-ninth height of eye ; length : width ratio of eye 18 : 12 ; third antennal segment small, round ; arista fine, bare, just less than width of eye.

Mesonotum : 2 + 0 *dc*, second two-thirds length of first, at level of *sa* ; *acr* in six rows, ending at second *dc*.

Wing : length in male 1·75 mm. ; costa extending uniformly to *m1* + *2*, *r-m* beyond midpoint of discal cell, *m-m* own length removed from *r-m* ; last segments of *m4* slightly longer than penultimate, in ratio 16 : 14.

Colour : frons matt black, ocellar triangle distinctly shining ; mesonotum largely matt, greyish-black, more shining when viewed from behind ; abdomen shining-black ; wings hyaline, veins brownish ; squamae and fringe white.

Holotype ♂, Seychelles : Silhouette, viii.1908 (*J. S. Gardiner*), in British Museum (Nat. Hist.).

This species closely resembles *M. decembris* sp. n. from the Cape Verde Islands. It can be distinguished by the more matt mesonotum, the stronger costa beyond vein *r5* and the narrower jowls.

Melanagromyza galactoptera Bezzi, 1926

Two specimens were recorded from Rodriguez.

Melanagromyza genata sp. n.

Head (fig. 29) (partially collapsed, complete description not possible) : frons not obviously projecting above eye but orbits conspicuous and slightly projecting ; ocellar triangle small ;

lunule sunk below frons ; jowls exceptionally deep, lower margin curved, one-third height of eye, cheeks conspicuously broad at base of antennae, continuing below eye as uniform broad ring ; base of antennae divided by broad keel, narrowing anteriorly, with distinct furrow upwards to lunule ; third antennal segment small, arista bare, equal to width of eye ; eye length : width ratio 15 : 10.

Mesonotum : 2 + 0 *dc*, second little more than half length of first, at level of *sa* ; *acr* in six rows, extending to first *dc*.

Wing : length in male 1·75 mm. ; costa extending strongly to *m1* + *2*, *r-m* at mid-point of discal cell, parallel with *m-m* ; last segment of *m4* in ratio 12 : 15 with penultimate.

Colour : frons matt black, ocellar triangle and orbits weakly shining ; jowls brownish-black ; mesonotum largely shining-black ; halteres blackish-brown ; wings hyaline, veins dark brown ; squamae grey, fringe black.

Holotype ♂, South Africa : Pretoria, x.1931 (*J. Ogilvie*), deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.).

This species appears to be almost intermediate between the genera *Ophiomyia* and *Melanagromyza*. It is placed tentatively in *Melanagromyza*, since the jowls do not project forward and the facial keel is not bulbous.

Melanagromyza gossypii sp. n.

A leaf-miner on *Gossypium*.

Head. (largely collapsed in the single available specimen and little detail detectable) : eye longer than broad ; jowls slightly extended in front, forming distinct angle ; third antennal segment small, round ; arista plumose, equal in length to height of eye.

Mesonotum : two *dc*, second before level of *sa*, two-thirds length of first ; *pa* similar to first *dc* ; *i.pa* and *ia* equal, weak ; *acr* regular, in six rows at second *dc*, diminishing to two rows between first and second *dc*, none at level of first *dc*.

Wing : length 1·6 mm. ; costa extending to *r5*, *r-m* at point four-fifths along discal cell, last and penultimate segments of *m4* equal.

Legs : *t2* without postero-dorsal bristles.

Colour : head black ; mesonotum largely matt blackish-brown but with distinct subshine ; abdomen shining-black ; legs uniformly brownish-black ; wings hyaline, veins brown ; squamae grey, margins black, fringe brownish-black.

Holotype ♀?, Nigeria : Ibadan, 1926, bred "from leaf-mine in cotton leaf" (*O. B. Lean*), deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.).

This species pupates in the leaf, with the anterior spiracles projecting through the epidermis, the posterior spiracles remaining beneath the surface. The puparium is orange-brown, 2·2 mm. long, 0·9 mm. wide.

Melanagromyza gracilis sp. n.

Head (fig. 30) : frons broader than eye, in ratio 8 : 6, not projecting above eye in profile ; upper ors slightly stronger than lower ; orbital setulae relatively long and numerous, in uniform row from before lower ori to upper ors ; cheeks forming narrow ring below eye, jowls with curving margin, conspicuously deepest in front, in ratio 2 : 13 with vertical height of eye ; eye length : width ratio 13 : 10 ; third antennal segment small, round, with fine, relatively long pubescence ; arista inconspicuously pubescent, in length ratio 11 : 9 to eye width.

Mesonotum : *acr* in six rows, two rows at level of first *dc*.

Wing : length in female 1·6 mm.

In all other points this species agrees exactly with *Melanagromyza vigneae* Séguy, from which it is immediately distinguishable by the conspicuously projecting jowls.

Holotype ♀, Belgian Congo: Parc National Albert, Cratère Mugunga, 1933 (*De Wulf*); *paratypes*, 2 ♀, same data. Holotype and one paratype in Musée Royal du Congo Belge, Tervuren; one paratype in author's collection.

Melanagromyza gymnosporiae Hering, 1957

South Africa: Capetown, Kirstenbosch. Bred from leaf-mines on *Gymnosporia buxifolia* (L.) Szyszl. Type in Transvaal Museum, Pretoria.

Melanagromyza gynurae, **nom. nov.** for *viridis* Séguy, nec *viridis* Frost, 1931.

Melanagromyza viridis Séguy, 1951.

Madagascar: Tananarive, Tsimbazaza. Bred from leaf-mines on *Crassocephalum* (*Gynura*) *sarcobasis* S. Moore. Holotype and paratypes in Muséum national d'Histoire Naturelle, Paris. Details of leaf-mine not available.

This species closely resembles *M. compositana* sp. n., but is distinguishable by the less pubescent arista and more brilliantly shining greenish mesonotum. It also appears to be a smaller species; the holotype is described as having a wing length of 2·5 mm., while that of a female paratype I have studied is 2·8 mm.

Melanagromyza insolita sp. n.

A small species with abnormal wing venation.

Head: frons narrow, equal to width of eye, not visible in profile; two ors and two ori; upper ors strong, directed upwards; lower ori weak, directed inwards (other orbital bristles broken, relative strength not detectable); orbital setulae long, reclinate, regular; ocellar triangle narrow and elongated, extending to upper ori; lunule in form of semicircle; jowls narrow, rounded, deepest in front, one-tenth height of eye; eye large, length : width ratio 18 : 14; third antennal segment small, round, with short but distinct upcurved pubescence; arista bare, short, shorter than width of eye.

Mesonotum: 2 + 0 *dc*, first substantially stronger than second (both broken), second slightly before level of *sa*; *acr* coarse, in eight rows, a few hairs extending to first *dc*; *ia* and *i.pa* slight, twice length of *acr*.

Wing (fig. 31): length 1·7 mm.; costa terminating at *r5*, position of *m-m* abnormal, basad of *r-m*; last segment of *m4* twice length of penultimate.

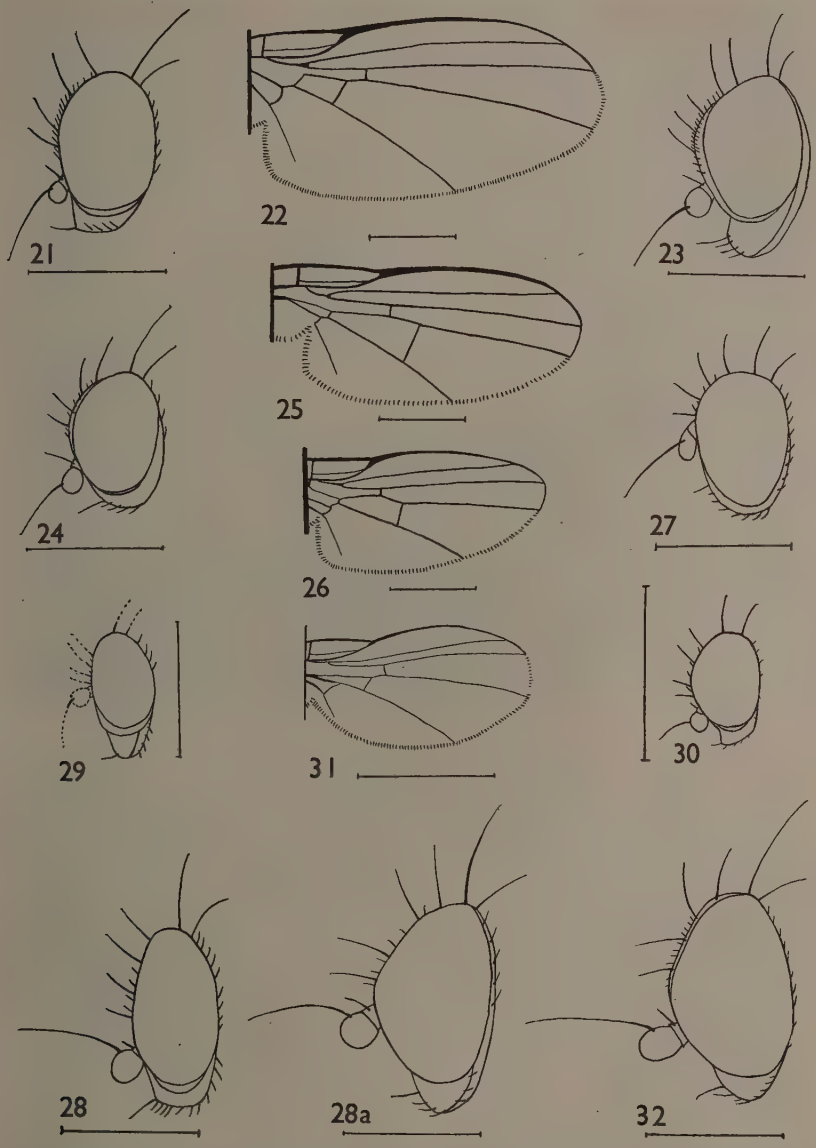
Colour: ocellar triangle conspicuously shining black, orbits less so; mesonotum shining-black but with distinct greyish dusting; abdomen wholly shining-black; squamae whitish, with yellowish-brown margins and white fringe.

Holotype ♀, Cape Verde Islands: S. Tiago, Achada, Robao Areia, 11.ii. 1954 (*H. Lindberg*), in Museum Zoologicum Universitatis, Helsinki.

Melanagromyza kenyensis sp. n.

A polyphagous species feeding on Compositae and *Croton* sp. (Euphorbiaceae).

Head: frons width variable, equal to or slightly wider than width of eye, not projecting above eye in profile; two strong ors directed upwards, the upper slightly longer; two ori,



FIGS. 21–32.—*Melanagromyza :* (21) *curiosa* sp. n., head ; (22) the same, wing ; (23) *curvibucca* sp. n., head ; (24) *dakarensis* sp. n., head ; (25) the same, wing ; (26) *decembris* sp. n., wing ; (27) *dicksoni* Hg., head ; (28) *difficilis* sp. n., head ; (28*a*) *elongata* sp. n., head ; (29) *genata* sp. n., head ; (30) *gracilis* sp. n., head ; (31) *insolita* sp. n., wing ; (32) *kikuyuana* sp. n., head.

the upper directed upwards, the lower slightly weaker and directed predominantly inwards ; distance between ors and between lower ors and upper ori equal, double that between ori ; orbital setulae reclinate, extending uniformly from lower ori to upper ors ; ocellar triangle relatively inconspicuous, apex extending only to midway between ors ; lunule slightly higher than semicircle, upper margin at level of lower ori ; orbits not differentiated ; cheeks linear, jowls rounded, slightly deeper in centre, in ratio 3 : 27 with vertical height of eye ; vibrissa strong, equal to upper ori, numerous weaker peristomal hairs ; eye conspicuously elongated, twice as high as broad ; third antennal segment small, slightly longer than broad, pubescence short ; arista long, with short pubescence, length ratio with vertical height of eye 23 : 27.

Mesonotum : 3 + 0 *dc*, two strong, second slightly before level of *sa* and not greatly shorter than first ; third weak *dc* only twice length of *acr*, close to second ; *ia* strong, slightly over half length of first *dc* ; weak *i.pa* equal to third *dc* ; *acr* numerous, regular in ten rows, six rows extending to first *dc*, a few hairs beyond.

Wing : length 3 mm. ; costa extending to *m1* + *2*, *r-m* slightly beyond midpoint of discal cell, last segment of *m4* two-thirds length of penultimate.

Legs : t2 with two strong postero-dorsal bristles.

Colour : frons matt black, ocellar triangle and orbits weakly shining ; mesonotum predominantly shining-black, distinctly matt when viewed from front ; wings hyaline, veins brown ; squamae dark grey, margins black, fringe blackish-brown.

Holotype ♀, KENYA : Naivasha, iv.1937, bred " ex Compositae 7 " (*H. J. Turner*), deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.). *Allotype* ♂ same data. *Paratypes :* 2 ♀, same data, one in British Museum (Nat. Hist.), one in author's collection.

A series of ten specimens bred " ex *Croton* sp." from Nairobi has been examined and these are unmistakably referable to this species. This represents a striking case of polyphagy. Further specimens from Teita Hills and Ngong in Kenya have also been examined. The species thus appears to be widespread in Kenya.

Melanagromyza kikuyuana sp. n.

Head (fig. 32) : frons one and half times width of eye, broader than long, not or scarcely projecting above eye in profile ; two strong equal ors directed upwards, the lower also slightly inwards ; two similar equal ori directed inwards ; orbits widening between upper ori and lunule ; orbital setulae short and sparse, proclinate below upper ori, upright above, only single hair above lower ors ; ocellar triangle large, extending to upper ori ; lunule broad, flattened above, extending to lower ori ; cheeks linear, jowls narrow, rounded, one-tenth height of eye ; eye large, length : width ratio 28 : 18 ; antennae set apart, third segment large, rounded, with fine, short, pubescence ; arista long, shortly plumose.

Mesonotum : 2 + 0 *dc*, second distinctly behind level of *sa*, half length of first ; *ia* strong, equal to second *dc* ; *i.pa* minute, equal to *acr* ; *acr* short and thick in ten rows, a few irregular hairs at level of first *dc*.

Wing : length 3·2 mm. ; costa extending to *m1* + *2*, *r-m* at centre of discal cell, last segment of *m4* only slightly more than half length of penultimate.

Colour : frons matt black, ocellar triangle somewhat shining, blackish ; orbits slightly greyish, shining only at base of orbital bristles ; lunule matt grey ; mesonotum shining blackish-green ; abdomen shining-coppery ; squamae white, fringe white to pale golden ; wings hyaline, veins brown, reddening at base.

Holotype ♀, KENYA : Kikuyu, 9.iii.1951, " ex pigeon pea " (*G. M. Lavers*) ; *allotype* ♂, *paratypes*, 2 ♂, 3 ♀, same data, all in British Museum (Nat. Hist.).

Melanagromyza lamborni sp. n.

Head : frons at upper ors one and a half times width of eye, not projecting above eye in profile ; two ors directed upwards, the upper weaker ; two equal ori directed inwards ; orbital setulae short, all reclinate, extending only from lower ori to lower ors ; ocellar triangle broad. extending to lower ors ; lunule narrow, slightly higher than semicircle ; cheeks linear, jowls rounded, deepest in centre, one-seventh height of eye ; eye large, length : width ratio 28 : 18 ; antennae somewhat separated, third segment rounded, broader than long, scarcely pubescent ; arista equal to width of eye, not conspicuously plumose.

Mesonotum : 2 + 0 *dc*, second relatively short, slightly behind level of *sa* ; *ia* strong ; *i.pa* little larger than *acr* ; *acr* thick in twelve rows, at first *dc* in eight rows.

Wing : length 2·6 mm. ; costa extending to *m1* + *2*, *r-m* at mid point of discal cell, last segment of *m4* in ratio 16 : 26 with penultimate.

Colour : frons matt black, ocellar triangle and orbits shining ; mesonotum shining bluish-black, with slight matt undertone, abdomen conspicuously shining bluish-green ; wings hyaline, veins pale brown, conspicuously so at base ; squamae and fringe white.

Puparium : yellowish to pale brown, 3·1 mm. × 1·2 mm. ; posterior spiracular processes (fig. 33) arising from a broad common base, which divides into two equal diverging arms, each bearing an ellipse of 10 buds surrounding a minute horn ; the processes weakly chitinized, apart from the black horn.

Holotype ♀, 10.xi.1917 ; *allotype* ♂, 6.ix.1917 ; *paratypes*, 1 ♂, 8.ix.1917, 2 ♀, 8.ix.1917, all "GERMAN EAST AFRICA" (*W. A. Lamborn*), in British Museum (Nat. Hist.).

It has unfortunately not been possible to ascertain the plant from which the species was bred.

Melanagromyza longibucca sp. n.

Head (fig. 34) : frons one and a half times width of eye, projecting as narrow ring above eye in profile ; all bristles conspicuously strong ; two ors directed upwards, the upper slightly stronger ; three equal ori directed inwards and upwards, equal to lower ors ; orbital setulae slight, all reclinate, apart from one or two hairs in front, extending from between ors to before ori ; ocellar triangle extending to lower ors ; lunule well-defined, slightly higher than a semicircle, below plane of frons and entirely enclosed by the raised orbits ; antennae separated by very narrow facial keel, third segment broadening apically, with inconspicuous pubescence ; arista not plumose, long, ratio to eye width 20 : 15 ; length : width eye ratio 24 : 15 ; cheeks forming narrow ring below eye, jowls conspicuously elongated, deepest in centre, forming angle of 60°, one-quarter height of eye.

Mesonotum : 2 + 0 *dc*, second two-thirds length of first, at level of *sa* ; *ia* strong, equal to second *dc* ; *i.pa* small, twice length of *acr* ; *acr* short, regular, in twelve rows, extending in six rows to just beyond first *dc*.

Wing : length 2·7 mm. ; costa extending to *m1* + *2*, *r-m* slightly beyond mid-point of discal cell ; veins strong.

Legs : t2 with one postero-dorsal bristle.

Colour : frons matt brownish-black, orbits and vertical triangle slightly shining ; mesonotum shining blackish-green, abdomen greenish-coppery ; squamae white, margins very pale brown, fringe white ; legs entirely black.

Holotype ♂, S. RHODESIA : Rhodes, Inyanga National Park, 13.i.1955 (*B. R. Stuckenberg*), in Natal Museum, Pietermaritzburg.

Melanagromyza lustralis sp. n.

A minute species with conspicuously shining wings.

Head : frons one and a half times width of eye, not projecting above eye in profile, distinctly narrowing anteriorly ; two ors directed upwards, the upper slightly stronger ; two weaker, equal ori, the upper directed upwards, the lower slightly inwards ; ors conspicuously widely separated, distance between them twice that between lower ors and upper ori ; orbital setulae small, sparse, reclinate ; ocellar triangle slight, without well-defined furrow from apex to lunule ; orbits not differentiated ; lunule small and low ; cheeks visible as narrow ring below eye, jowls somewhat flattened, deepest at rear, in ratio 2 : 12 with height of eye ; vibrissa weak, peristomal hairs slight ; third antennal segment small, broader than long, arista without conspicuous pubescence.

Mesonotum : two *dc*, second half length of first, distinctly in front of *sa* ; *acr* irregularly in six rows, sparse behind second *dc*, none behind first ; *i.pa* minute, half length of *acr* ; *ia* weak, equal to *acr*.

Wing (fig. 35) : length in female 1·2 mm. ; costa extending to *m1* + *2*, *r-m* beyond midpoint of discal cell, last and penultimate segments of *m4* equal.

Legs : t2 without noticeably differentiated postero-dorsal bristle.

Abdomen : hairs somewhat sparse.

Colour : frons matt greyish-black, ocellar triangle scarcely shining ; mesonotum black, largely matt but with distinct subshine ; abdomen shining-black ; wings pale, shining, veins weak, light brown ; squamae white, fringe silvery-white.

Holotype ♀, Cape Verde Islands : S. Tiago, Prala, 5–14.ii.1954 (*Panelius*), in Museum Zoologicum Universitatis, Helsinki.

Melanagromyza metallica (Thomson), **comb. nov.**

Agromyza metallica Thomson, 1869.
Agromyza similis Lamb, 1912.
Agromyza lambi Hendel, 1923 (nom. nov. for *similis* Lamb, nec Brischke, 1880), **syn. nov.**
Melanagromyza similis (Lamb), Bezzi and Lamb, 1926, **syn. nov.**

I have examined the holotype of this species, kindly sent to me by the authorities of the Naturhistorika Riksmuseum, Stockholm. The specimen, from Mauritius, is in imperfect condition, but appears to agree exactly with the specimens described as *Agromyza similis* by Lamb from the Seychelles. Hendel (1923) renamed the species *Agromyza lambi*. Bezzi and Lamb (1926) referred a series of seven specimens from Rodriguez to Lamb's species, correctly placing it in the genus *Melanagromyza*, but overlooking Hendel's new name.

The full synonymy of the species is given above. I now redescribe it from a typical specimen from Lamb's series :

Head : frons not projecting above eye in profile ; two equal ors directed upwards ; two ori directed upwards and inwards, the upper slightly weaker than the ors, the lower somewhat over half length of upper ; orbital setulae fine, regularly reclinate, from ori to upper ors ; ocellar triangle extending to lower ors ; lunule slightly higher than semicircle, rounded ; cheeks linear, jowls narrow, one-tenth height of eye ; third antennal segment broader than long, rounded at end, with slight upcurved pubescence ; arista finely plumose.

Mesonotum : 2 + 0 dc, second half length of first, slightly behind level of *sa* ; *ia* slightly weaker than second *dc* ; *i.pa* little stronger than *acr* ; *acr* in eight rows, extending in four rows to behind first *dc*.

Wing : length 2·2–2·3 mm.

Colour : frons matt black, ocellar triangle conspicuously shining ; lunule grey ; mesonotum greenish-black, predominantly shining ; abdomen conspicuously shining-green ; squamae whitish, margins pale brown, fringe white.

Further distribution.—The following are tentatively referred to this species :

South Africa (Natal Museum), 1 specimen from Pietermaritzburg.

Belgian Congo (Musée Royal du Congo Belge, Tervuren), 20 specimens from widespread localities.

Melanagromyza minora sp. n.

Head : frons at foremost ocellus only slightly wider than eye, not projecting above eye in profile ; two equal ors directed upwards, two weaker ori directed inwards ; orbital setulae minute, uniformly reclinate, from below lower ori to midway between ors ; ocellar triangle large, extending to midway between lower ors and upper ori ; lunule somewhat constricted above, slightly higher than semicircle ; length : width eye ratio 18 : 12 ; jowls narrow, rounded, deepest at rear, one-ninth height of eye ; third antennal segment round, with noticeable pubescence, arista slightly longer than width of eye.

Mesonotum : 2 + 0 *dc*, second only slightly more than half length of first, behind level of *sa* ; *acr* fairly regular, in eight rows, several hairs at first *dc*.

Wing : length 1·9 mm. ; costa extending to *m1* + *2*, first cross-vein at midpoint of discal cell, last segment of *m4* two-thirds length of penultimate.

Colour : frons matt black, ocellar triangle and orbits shining-black ; mesonotum and abdomen conspicuously shining coppery-green ; squamae and fringe silvery-white, margins not darker.

Holotype ♀, Cape Verde Islands, S. Tiago, Lagoa, 15.ii.1954 ; *allotype* ♂, same data. *Paratypes :* 2 ♂, S. Tiago, Prala, ii.1954, 2 ♂, Boavista, Sal Re, 19.i–14.ii.54, 1 ♂, Prala, 3–14.ii.1954 (*all H. Lindberg*). Holotype, allotype and 3 paratypes in Museum Zoologicum Universitatis, Helsinki ; two paratypes in author's collection.

The species closely resembles *M. metallica* (Thoms.), but is distinguishable by the smaller size and by the jowls being deeper behind (in *metallica* deeper in front).

Melanagromyza mugungae sp. n.

Head (fig. 36) : frons, at broadest point of eye, one and a half times width of eye, increasingly projecting above eye in profile from vertex to base of antennae ; two equal ors, upper midway between *vti* and lower ors ; two weaker equal ori ; orbital setulae very sparse but unusually long, altogether about ten hairs from below lower ori to upper ors ; orbits narrow, not widening anteriorly ; ocellar triangle pronounced, extending to lower ors, continuing in raised outline to midway between ori ; lunule large, higher than a semicircle, rounded above ; cheeks broad, projecting uniformly above eye around base of antennae and widening below eye ; jowls deepest in centre, rounded, one-quarter height of eye ; face with sharp keel, dividing base of antennae ; narrow epistoma present, half breadth of third antennal segment ; third antennal segment round, pubescence not conspicuously long.

Mesonotum : 2 + 0 *dc*, second (broken) at level of *sa* ; *ia* weaker than second *dc* ; *i.pa* relatively strong ; *acr* short in ten rows, a few hairs at level of second *dc*.

Wing : length in female 2·8 mm. ; costa extending to *m1* + *2*, *r-m* distad of midpoint of discal cell, last and penultimate segments of *m4* in ratio 16 : 30.

Legs : t2 with two strong bristles.

Colour : frons matt black, ocellar triangle moderately shining ; mesonotum predominantly, abdomen brilliantly shining-black ; wings with distinct brownish tinge, veins brown, paler at wing base ; squamae pale whitish-grey, fringe black.

Holotype ♀, BELGIAN CONGO : Parc National Albert, Cratère Mugunga, 1933, (*De Wulf*), in Musée Royal du Congo Belge, Tervuren.

Melanagromyza nairobensis sp. n.

A species with long and thick orbital setulae and ochreous-orange squamal fringe.

Head : frons one and a half times width of eye, not significantly projecting above eye in profile ; two strong ors, the upper directed upwards and outwards, the lower upwards and inwards ; two strong equal ori directed inwards and slightly upwards ; orbital setulae reclinate, from before lower ori to upper ors, long and thick ; ocellar triangle narrow, extending to lower ors ; lunule slightly higher than a semicircle ; orbits pronounced, slightly widening at mid-height of lunule ; length : width ratio of eye 25 : 20 ; jowls deepest in centre, one-fifth height of eye ; third antennal segment round, arista plumose, equal in length to height of eye.

Mesonotum : two *dc*, the second little over half length of first ; *ia* strong, two-thirds length of second *dc*, *i.pa* slight, scarcely longer than *acr* ; *acr* thick, in ten rows, thinning behind second *dc*, but several hairs even behind first *dc*.

Wing : length 3 mm. ; costa extending strongly to *m1* + *2*, *r-m* slightly beyond mid-point of discal cell, last segment of *m4* two-thirds length of penultimate.

Legs : t2 with two strong postero-dorsal bristles.

Colour : frons matt brownish-black ; orbits and ocellar triangle weakly shining-black ; lunule grey ; mesonotum blackish with slight greenish sheen but matt when viewed from front ; abdomen shining coppery-green ; squamae whitish-orange, margins slightly darker, fringe ochreous-orange ; veins dark-brown.

Holotype ♂, KENYA : Nairobi, vii.1937 (*Van Someren*), deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.). *Paratypes :* same data, 1 ♂, Commonwealth Institute of Entomology, 1 ♂ in author's collection.

Other specimens are referred to this species from TANGANYIKA, in the Naturhistorisches Museum, Vienna ; from the BELGIAN CONGO, in the Musée Royal du Congo Belge, Tervuren ; and from UGANDA and KENYA, in the British Museum (Nat. Hist.), presented by the Commonwealth Institute of Entomology. These specimens show slight differences from the type : the coloration of the mesonotum varies from blackish-coppery to blackish-green, and the squamal fringe varies from orange to dark-ochreous to brown. All specimens, however, have the characteristic arrangement of the strong orbital bristles, identical wing venation and no significant difference can be found in the genitalia of six males. It seems possible that this material represents a species group, but in view of the slight differences detectable in the limited number of specimens available, further splitting will only be possible when the biology has been clarified.

Melanagromyza natalensis sp. n.

Head (fig. 37) : frons broad, one and a half times width of eye, distinctly projecting above eye in profile, conspicuously so above base of antennae ; orbits widening anteriorly, conspicuously broad above base of antennae; two equal ors directed upwards, two ori directed inwards and upwards, only slightly weaker than ors ; both ors and upper ori arising from centre of orbits, lower ori from inner margin ; distance from eye margin to lower ori double that of upper ori ; orbital setulae reclinate, short, in several rows from below lower ori to upper, in single row from upper ori to upper ors ; ocellar triangle broad, extending to lower ors ; lunule high but narrow, enclosed by broadened orbits ; cheeks

conspicuous at base of antennae and below eye ; jowls prominent, angular, deepest at rear, in centre one-fifth height of eye ; vibrissa short, significantly slighter than ori, peristomal hairs weak ; eye length : width ratio 24 : 16 ; third antennal segment small, arista not conspicuously plumose, equal to width of eye ; prominent epistoma present, height equal to breadth of third antennal segment.

Mesonotum : 2 + 0 *dc*, second substantially shorter than first, in front of *sa* ; *ia* only slightly shorter than second *dc*, *ia* twice length of *acr* ; *acr* coarse, in eight rows, a few hairs only at first *dc*.

Wing : length in female 2·8 mm., in male 2·6 mm. ; costa extending to *m1* + *2*, *r-m* beyond midpoint of discal cell, last and penultimate segments of *m4* in ratio 17 : 26.

Colour : frons matt black, ocellar triangle and orbits only weakly shining (in the female holotype there is a brownish undertone along the orbits and around the ocellar triangle, but this is believed to be due to incomplete pigmentation) ; mesonotum largely shining-black, abdomen brilliantly so ; wings hyaline, veins brown ; squamae pale greyish, fringe black.

Holotype ♀, Natal : Merebank, x.1931 (*Miss A. Mackie*), in British Museum (Nat. Hist.) ; *allotype* ♂, Drakensberg, Cathedral Park area, 6400 feet, 23.iii.1955 (*B. R. Stuckenberg*), in Natal Museum, Pietermaritzburg.

Melanagromyza nicolaudis sp. n.

A small, conspicuously shining-black species.

Head : frons wider than eye, in ratio 10 : 8, not projecting above eye in profile ; two strong equal ors directed upwards ; two equal, more slender ori, the upper directed upwards and inwards, the lower slightly inwards ; orbital setulae sparse, slender, reclinate ; ocellar triangle well-defined, apex extending to lower ors ; lunule low, flatter than semicircle ; cheeks linear, jowls rounded, deepest in centre, in ratio 2 : 18 with height of eye ; vibrissa long and slender, similar to lower ori, numerous smaller peristomal hairs ; eye length : width ratio 18 : 12 ; third antennal segment rounded, with slight upcurved pubescence, arista short, plumose.

Mesonotum : two *dc*, second two-thirds length of first ; *ia* half length of second *dc* ; *i.pa* twice length of *acr* ; *acr* in six to eight rows, extending in two rows to first *dc*.

Wing : length in male 1·9 mm. ; costa extending to *m1* + *2*, *r-m* beyond midpoint of discal cell, last and penultimate segments of *m4* in ratio 11 : 20.

Legs : t2 with one conspicuous postero-dorsal bristle.

Abdomen : covered in coarse hairs.

Colour : frons matt black, ocellar triangle and orbits conspicuously shining-black ; mesonotum uniformly shining-black ; pleura and abdomen all shining-black ; wings clear hyaline, veins dark-brown ; squamae dark grey, fringe black.

Holotype ♂, Cape Verde Islands : Nicolau, Chã da Preguisa, 13–17.xii.1953 (*H. Lindberg*) ; *allotype* ♀, Antão, Chã de Morte, 6–19.xii.53, in Museum Zoologicum Universitatis, Helsinki. *Paratypes :* 6 ♂, Nicolau, 6–19.xii.1953 ; 1 ♂, Fogo supra Fte Aleixo, 19.ii.54 ; 1 ♀, Antão, Chã de Morte, 6–19.xii.53 ; seven in Museum Zoologicum Universitatis, Helsinki, two in author's collection.

This species most closely resembles *M. phaseoli* (Tryon), but is distinguishable by its broader frons, smaller and less shining ocellar triangle and darker veins.

Melanagromyza nigriclava (Bezzi), **comb. nov.**

Domomyza nigriclava Bezzi, 1925.

Mauritius, 1918. Holotype ♂ in British Museum (Nat. Hist.).

Head in the single available specimen largely collapsed and little detail detectable; ocellar triangle narrow, elongated, extending beyond lower ors; arista relatively long but shorter than vertical height of eye; mesonotum somewhat matt when viewed from front, distinctly shining-black from behind; *acr* largely ending at second *dc*, a few scattered hairs behind, none at first *dc*; wing length 1·7 mm.; costa ending at *r5*, distance between cross-veins short, equal to length of *m-m*; costal segments 2, 3, 4 in ratio 32 : 9 : 8; veins pale brown.

This species belongs to the homogeneous group of small leaf-miners with the costa ending at vein *r5*.

Melanagromyza nigrimaculata sp. n.

A unique species with subcostal area of wing black.

Head: frons one and a half times width of eye, not projecting above eye in profile; two strong ors directed upwards, the upper slightly longer; two weaker equal ori directed mainly inwards; orbital setulae slight, sparse, reclinate; ocellar triangle large, apex extending to upper ori; lunule lower than a semicircle, flat above; cheeks linear, jowls rounded, narrow, one tenth height of eye; eye length : width ratio 23 : 17, third antennal segment small, rounded, arista conspicuously long, equal to height of eye.

Mesonotum: 2 — 0 *dc*, second two-thirds length of first, slightly before level of *sa*; *acr* in eight rows, two hairs behind level of first *dc*.

Wing (fig. 38): length 2·5 mm.; costa extending to *m1* + *2*, *r-m* at anterior third of discal cell, last segment of *m4* three-fifths length of penultimate.

Colour: ocellar triangle, area of vertical bristles and orbits brilliantly shining-black, remainder of head matt black; mesonotum and abdomen entirely shining-black; wing base, subcostal area and slight extension beyond brownish-black, remainder hyaline, normal; veins dark; squamae grey, margin and fringe black.

Holotype ♂, Uganda: Bwamba, vi.1948 (*Van Someren*), presented by Commonwealth Institute of Entomology to British Museum (Nat. Hist.). *Allotype* ♀, Belgian Congo: Parc National Albert, Cratère Mugunga, 1933 (*De Wulf*), in Musée Royal du Congo Belge, Tervuren. *Paratype*, 1 ♀, Belgian Congo: Kasengi, 19.viii.1937 (*H. J. Brédo*), in author's collection.

Further distribution.—Belgian Congo: Kwango, Kikwit (2), 29.xii.1951. Nigeria: Ibadan, 4.ix.1920.

Melanagromyza parvisetula sp. n.

Head (fig. 39): frons conspicuously broad, twice width of eye; orbits and frons strongly projecting above eye in profile; two ors, directed upwards, the lower closer to eye margin than upper; two ori (on one side three); ors and ori all approximately equidistant; orbital setulae conspicuously small, predominantly upright or incurved at ori, minute and sparse above, two hairs between upper ors and *vt*; ocellar triangle tapering, extending to lower ors; lunule conspicuous, semicircular, with furrow in centre; cheeks forming broad ring at base of antennae, continuing uniformly below eye; jowls prominent, deepest at rear, one-fifth height of eye; one strong vibrissa, row of six peristomal hairs, not greatly weaker; eye length : width ratio 24 : 18; broad epistoma above mouth margin equal to breadth of third antennal segment; this longer than broad, with short, upcurved pubescence, arista equal to height of eye, conspicuously bare.

Mesonotum: 2 — 0 *dc*, first conspicuously long, second four-fifths length of first, at level of *sa*; *acr* in ten rows, two hairs beyond first *dc*.

Wing: length in female 3·3 mm.; costa extending to *m1* — *2*, *r-m* slightly beyond centre of discal cell, last and penultimate segments of *m4* in ratio 20 : 35.

Legs: *t2* with two strong bristles.

Abdomen : hairs coarse, basal cone of ovipositor conspicuously long and strong.

Colour : frons matt black, ocellar triangle weakly shining ; mesonotum shining-black, with slight bluish tinge ; abdomen strongly shining blackish-blue ; wings clear, veins black ; squamae dark grey, margins and fringe black.

Holotype ♀, MADAGASCAR : Ankaratra Massif, Manjakatompo forest station, i.1956 (*B. R. Stuckenberg*), in Institut de Recherches Scientifiques de Madagascar.

Melanagromyza passiflorae Hering, 1957

SOUTH AFRICA : Pretoria, bred from *Passiflora coerulea* L. *Holotype* in Transvaal Museum, Pretoria.

CAMEROONS : 2 specimens bred by Buhr from *Passiflora* ? *foetida* L. and *Passiflora* sp., in Zoologisches Museum der Humboldt-Universität, Berlin.

De Meijere described the puparium (1940 : 168), under *Melanagromyza spec. 5*. The larva forms an upper surface leaf-mine, pupating in the mine.

M. passiflorae belongs to the small group of species with black squamal fringe and costa extending only to vein *r5*. Hering, in his description, states that the species has only a single, inverted ori. This is not correct. Re-examination of the type shows that the lower ori are lacking on both sides and the upper ori also on one side, but the basal pit of these three bristles can be distinguished ; on the other side the upper, upcurved ori is clearly present. The two specimens from the Cameroons also show that this species has the arrangement of orbital bristles normal in this group, with the lower ori incurved and the upper ori and both ors upcurved.

Melanagromyza perinetensis sp. n.

Head : frons narrow, equal to width of eye, not projecting above eye in profile ; two ors, the upper slightly stronger ; two ori, both conspicuously strong, equal to lower ors ; orbital setulae relatively long, from before lower ori to upper ors ; ocellar triangle scarcely extending to lower ors ; orbits not greatly differentiated ; lunule narrow, slightly higher than semicircle, with rounded upper margin ; cheeks linear, jowls rounded, narrow, one-twelfth vertical height of eye ; eye large, length : width ratio 24 : 20 ; third antennal segment small, round, with distinct upcurved pubescence ; arista long, equal to eye width.

Mesonotum : 2 + 0 *dc*, second slightly in front of *sa* ; *acr* coarse, in eight rows, a few hairs behind level of first *dc*.

Wing : length in female 2·7 mm. ; costa extending to *m1* + *2*, *r-m* beyond midpoint of discal cell, last segment of *m4* in ratio 18 : 28 with penultimate.

Colour : frons matt black, ocellar triangle strongly shining from behind, very much less so from in front ; mesonotum shining-black, abdomen brilliantly so ; wing conspicuously brownish, veins dark ; squamae grey, fringe black.

Holotype ♀, MADAGASCAR : Périnet, xii.1955 (*B. R. Stuckenberg*), in Institut de Recherches Scientifiques de Madagascar.

Melanagromyza phaseoli (Tryon), **comb. nov.**

Oscinis phaseoli Tryon, 1895.
Melanagromyza phaseoli (Coquillet), 1899, **syn. nov.**
Agromyza fabalis Jack, 1913, **syn. nov.**
Agromyza destructor Malloch, 1916.
Melanagromyza phaseoli Vanschuytebroeck, 1951*a*.
Melanagromyza similis Vanschuytebroeck, 1951*b*, **syn. nov.**

My attention has kindly been drawn to a paper by Tryon (1895) which describes in some detail the biology of what is clearly this species. It is referred to as *Oscinis phaseoli* and a superficial description of the larva and puparium is given, but the author writes: "the technical description of the pest is postponed". This, as far as is known to me, never appeared. Under the rules of priority the species should nevertheless be credited to Tryon and *Melanagromyza phaseoli* (Coquillet) is thereby reduced to a synonym.

Jack (1913) describes the life-history of the serious pest attacking beans in Rhodesia, with illustrations of the adult and immature stages. The species is referred to as *Agromyza fabalis*, and it is stated that a description would shortly be published by Prof. Coquillet. This, as far as I know, did not appear and the name must therefore be ascribed to Jack. I am satisfied, however, that the species is synonymous with *M. phaseoli* (Tryon).

I have examined the type series of *Melanagromyza similis* Vanschuytebroeck and am satisfied that the species is synonymous with *M. phaseoli* (Tryon). The pale halteres referred to in the description are merely due to incomplete pigmentation in specimens which have been killed too soon after emergence.

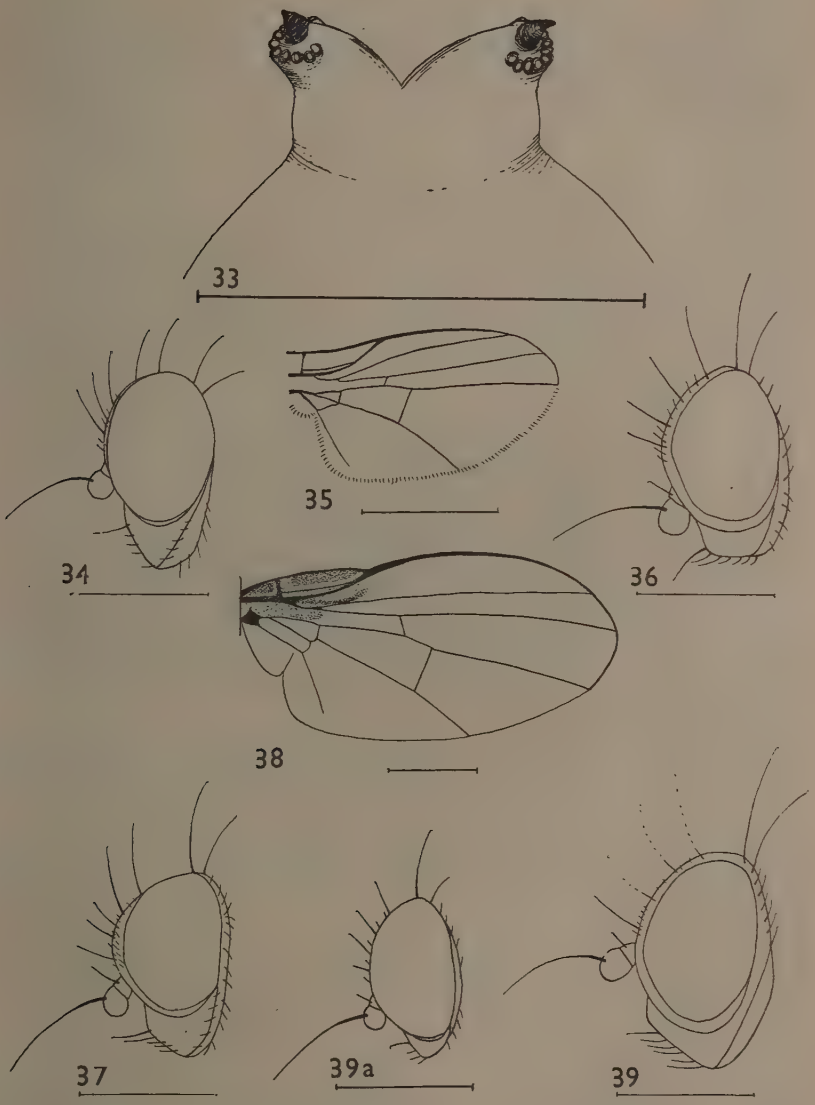
This species appears to be the most serious, commonest and most widespread of the Agromyzid pests on beans. It is readily distinguishable from all other species feeding on Leguminosae, and in view of its importance the following brief description is given:

Head: frons not projecting above eye in profile, relatively narrow, equal to width of eye; two ors, the upper slightly stronger; two weaker ori; ocellar triangle strongly shining-black, narrow, elongated, apex extending almost to upper ori; orbits not raised, but conspicuously shining; cheeks linear, jowls prominent, rounded, one-seventh height of eye; mesonotum and abdomen brilliantly shining-black; wing length 2·2 mm.; costa extending to *m1* — 2, *r-m* at anterior third of discal cell, last and penultimate segments of *m4* in ratio 14 : 20, veins pale brown; squamae grey, fringe black.

The species has been recorded in Africa from *Phaseolus vulgaris* L. (Kidney beans), *P. lunatus* L. (lima beans) and *Vigna sinensis* Endl. *ex* Hassk. (cow peas), and in Java has been reported, in addition, on *Soja hispida* Moench., *Cajanus indicus* L., *Dolichos lablab* L. and *Crotalaria juncea* L. (Van der Groot, 1930). Its biology has been very completely dealt with by Otanes y Quesales (1918), Van der Groot (1930) and Hassan (1947). Oviposition normally takes place in the leaves of young bean plants and the larvae quickly move to the stem, or, in older plants, to the petiole, where the main development takes place. The puparia remain in the stem or petiole, which swell as a result. The larva and puparium have been described by de Meijere (1922), who also synonymised *Agromyza destructor* Mall. with this species. I have seen specimens from Egypt, clearly referable to this species, which were stated to have been bred from galls, but I consider that the normal swollen stems were in this case mistaken for galls.

Confirmed records of the species in Africa known to me are: Belgian Congo; Nyasaland; Rhodesia; Senegal; South Africa: Capetown and Pretoria; Uganda.

The species occurs in Australia, Java, Malay, the Phillippines and Mauritius. Frick has recently confirmed the species from various localities in Micronesia. I have also examined specimens from Palestine: Gaza.



FIGS. 33–39*a*.—*Melanagromyza* : (33) *lamborni* sp. n., posterior spiracles of puparium ; (34) *longibucca* sp. n., head ; (35) *lustralis* sp. n., wing ; (36) *mugungae* sp. n., head ; (37) *natalensis* sp. n., head ; (38) *nigrimaculata* sp. n., wing ; (39) *parvisetula* sp. n., head ; (39*a*) *philocroton* Hg., head.

Melanagromyza philocroton Hering, 1957

South Africa: Pretoria. Bred from leaf-mine on *Croton subgratissimus* Prain. Holotype in Transvaal Museum, Pretoria.

The species most closely resembles *M. crotalariae* Hg., but can be readily distinguished by the more angular jowls, which are deepest in the centre (fig. 39*a*).

Melanagromyza pubescentis sp. n.

Head (fig. 40): frons one and a half times width of eye, narrowly but distinctly projecting above eye in profile from vertex to lower ori; orbits not greatly differentiated; two ors directed upwards; two ori, not substantially weaker, directed inwards and upwards; orbital setulae reclinate, more numerous in front, extending to upper ors; ocellar triangle not greatly elongated, reaching to midway between ors; lunule broad, slightly higher than semicircle, below plane of frons; cheeks linear, just visible as narrow ring below eye; jowls conspicuous, deepest in centre, one-quarter height of eye; eye length: width ratio 20 : 16; vibrissa half length of ori, strong peristomal hairs present; face with low keel narrowly separating base of antennae; keel with slight furrow above antennae, continuing across lunule; third antennal segment rounded at end but longer than broad, with conspicuously long, upcurved pubescence.

Mesonotum: 2 + 0 *dc*, second at level of *sa*, two-thirds length of first; *ia* strong, slightly weaker than second *dc*; *i.pa* slight, double length of *acr*; *acr* short, in two rows at second *dc*, sparser, more irregular, longer at first *dc*.

Wing: length in male 2·6 mm., in female 2·9 mm.; costa extending to *m1* + *2*, *r-m* slightly beyond midpoint of discal cell, last and penultimate sections of *m4* in ratio 15 : 25.

Legs: *t2* with one strong postero-dorsal bristle.

Colour: frons matt black, ocellar triangle distinctly shining; antennal pubescence whitish; mesonotum shining-black, somewhat matt when viewed from front; abdomen brilliantly shining-black; wings with faint brownish tinge, veins brown; squamae grey, margins and fringe black.

Holotype ♂, S. Rhodesia: Mt. Chirinda, 3800 feet, 28.v.1911 (*C. F. M. Swynnerton*), deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.). *Allotype* ♀, Belgian Congo: Parc National Albert, Cratère Mugunga, 1933 (*De Wulf*), in Musée Royal du Congo Belge, Tervuren. *Paratype*, 1 ♂, Kivu, contr. S. Kahuzi, 2200 m., 27.iii.53 (*P. Basilewsky*), in author's collection. Four specimens from Kenya, Meru, are referred to this species, and also one from Urundi, Bururi.

Melanagromyza purpurea sp. n.

A large species with a characteristic shining, purple abdomen.

Head: frons broad, almost twice width of eye, projecting as narrow ring above eye in profile, most conspicuous between ori; two ors directed upwards, the upper slightly stronger; two (in one specimen three) ori directed inwards, equal to lower ors; distance between ors and between lower ors and upper ori approximately equal; between upper and lower ori distinctly greater; orbital setulae short and sparse, from upper ors to before lower ori, reclinate apart from one or two hairs in front which are proclinate; ocellar triangle large, well defined, extending to lower ors; lunule substantially higher than a semicircle, rounded, extending to upper ori, slightly constricted at sides by the broadened, conspicuous orbits; antennae separated by narrow facial keel; third segment small, round, without conspicuous pubescence; arista plumose but not conspicuously so, length

ratio to eye width 5 : 4 ; cheeks visible as narrow ring below eye, jowls deepest in front, together one-sixth height of eye ; eye length : width ratio 3 : 2.

Mesonotum : 2 + 0 *dc*, second two-thirds length of first, slightly behind level of *sa* ; *ia* strong but slightly weaker than second *dc* ; *i.pa* well-developed, twice length of *acr* ; *acr* coarse in ten to twelve rows, extending irregularly in six rows to behind first *dc*.

Wing : length 3·25 mm. ; costa extending to *m1* + 2, first cross-vein conspicuously oblique, normally beyond midpoint of discal cell ; last segment of *m4* relatively long, in ratio 25 : 32 with penultimate.

Legs : t2 with two strong postero-dorsal bristles.

Colour : frons matt brownish ; ocellar triangle brilliantly shining-black ; orbits shining-black ; lunule blackish-grey ; mesonotum largely shining, blackish, with slight tendency to purple ; abdomen brilliant shining-purple ; wings slightly brownish, veins dark-brown ; squamae whitish, margins pale brown, fringe white.

Holotype ♀, South Africa : Pietermaritzburg, 20.xi.1955 (*B. R. Stuckenberg*) ; ♀ *paratypes* : 2 same data ; 1, Natal, near Hillcrest, 20.xii.1954 (*B. R. Stuckenberg*), two in Natal Museum, one in author's collection.

Melanagromyza purpureana sp. n.

This species superficially resembles *M. purpurea* sp. n., but is smaller and is readily distinguishable by the following characteristics :

Head : frons narrower, one and a half times width of eye, not projecting above eye in profile ; ocellar triangle elongated, extending beyond lower ors ; lunule forming semi-circle ; orbits not pronounced ; distance between ors slightly greater than between ori ; antennae with third segment large, longer than broad, with distinct pubescence ; jowls narrow, one-tenth height of eye. Second *dc* further removed from first, before level of *sa*.

Wing : length 2·7 mm., first cross-vein not oblique, last segment of *m4* shorter, half length of penultimate.

Mesonotum : characteristically purple. In all other points agreeing with *M. purpurea*.

Holotype ♀, Madagascar, Périnet, xii.1955 (*B. R. Stuckenberg*), in Institut de Recherches Scientifiques de Madagascar.

Melanagromyza ruandae sp. n.

Head (fig. 41) : frons at foremost ocellus almost twice width of eye, orbits prominent, conspicuously projecting above eye in profile from lower ors to base of antennae ; two long, equal ors directed upwards, two equally strong ori directed inwards and upwards ; orbital setulae all reclinate, more numerous in front, sparse between ors, a single hair above ; ocellar triangle ill-defined, extending in outline to upper ors ; lunule small, rounded, sunk below plane of frons ; cheeks distinct as ring below eye, jowls broad, deepest in centre, one-quarter height of eye ; vibrissa strong but weaker than ori, twice length of peristomal hairs ; third antennal segment round, conspicuously pubescent, arista long, ratio to eye width 25 : 18 ; margin of mouth somewhat raised, face with low keel ; eye length : width ratio 28 : 18.

Mesonotum : 2 + 0 *dc*, second two-thirds length of first, at level of *sa* ; *ia* strong, scarcely weaker than second *dc* ; *i.pa* twice length of *acr* ; *acr* coarse in ten rows, several hairs extending to first *dc*.

Wing : length in female 3·6 mm. ; costa extending to *m1* + 2, *r-m* well distad of midpoint of discal cell, last and penultimate segments of *m4* in ratio 25 : 38.

Legs : t2 with two strong bristles.

Abdomen : hairs long and coarse.

Colour : an all-black species ; frons matt, ocellar triangle and orbits scarcely shining ; lunule grey ; mesonotum black, weakly shining ; abdomen brilliantly shining, black ; wings clear, veins black ; squamae blackish-grey, fringe conspicuously black.

Holotype ♀, Belgian Congo : Ruanda-Urundi, Bururi, x.1948 (*François*), in Musée Royal du Congo Belge, Tervuren.

Two female specimens are also referred to this species from Ruanda, Mahembe and Gold Coast. *M. ruandae* superficially resembles *M. setulana* sp. n., but is distinguishable by the more highly projecting but narrower orbits, the less numerous orbital setulae and larger size.

Melanagromyza rutshurensis sp. n.

A large species with conspicuously high, narrow lunule.

Head (fig. 42) : frons one and a half times width of eye, slightly projecting above eye in profile ; two strong equal ors directed upwards, two weaker equal ori directed inwards ; orbital setulae in two rows, outer row near eye reclinate, inner row proclinate below upper ori ; ocellar triangle elongated, extending beyond lower ors almost to margin of lunule ; lunule characteristically narrow and substantially higher than a semicircle, at front ori equal in width to an orbit, thus one-third width of frons ; orbits pronounced, widening anteriorly and slightly constricting lunule in centre ; jowls deepest in centre, uniformly rounded, one-fifth height of eye ; cheeks linear ; third antennal segment small, round, with only short pubescence, arista long, equal in length to height of eye, conspicuously plumose ; base of antennae separated by narrow raised keel ; eye length : width ratio 25 : 20.

Mesonotum : 2 + 0 *dc* (both missing) ; *acr* (all missing) appear from basal pits to be coarse and to extend to first *dc*.

Wing : length 3 mm. ; costa extending to *m1* + *2*, *r-m* slightly beyond centre of discal cell, last segment of *m4* two-thirds length of penultimate.

Legs : t2 with two strong postero-dorsal bristles.

Abdomen : hairs short.

Colour : ocellar triangle and orbits somewhat shining ; frons matt blackish-brown, lunule lighter, blackish-grey ; mesonotum conspicuously shining, blackish-green ; abdomen shining, bronze ; squamae yellowish-white, margins only slightly darker, fringe white.

Holotype ♂, Belgian Congo : Rutshuru, 15.vi.1937 (*Mission Prophylactique*) ; *paratype* ♂, same data, both in Musée Royal du Congo Belge, Tervuren.

Three further males from the Belgian Congo : Ruanda, are referred to this species, agreeing in the characteristic form of the frons and lunule, although the arista is less plumose and the squamal fringe more ochreous. Two are in the Musée Royal du Congo Belge, one in the author's collection.

Melanagromyza setulana sp. n.

Head (fig. 43) : frons at foremost ocellus twice width of eye and twice distance from foremost ocellus to upper margin of lunule, not projecting above eye in profile ; two strong equal ors directed upwards ; two weaker equal ori directed inwards and upwards; orbits slightly raised above frons, conspicuously broad, from vertex widening to lower ors, there slightly narrowing and again widening at mid-height of lunule ; orbital bristles arising from inner margin of orbits ; distance between ori and eye margin wider than width of third antennal segment ; orbital setulae all reclinate, conspicuously long and numerous in at least four rows, at ori completely filling area between eye margin and ori, thinning above

and extending only to lower ors ; ocellar triangle relatively short, extending only to upper ors ; lunule small, narrow, rounded above, sunk below plane of frons ; eyes in male conspicuously haired opposite ori ; third antennal segment rounded, with conspicuous upturned pubescence ; arista long, not plumose ; cheeks forming distinct ring below eye, jowls broad, deepest in centre, ratio to height of eye 5 : 24 ; vibrissa equal to ori, numerous peristomal hairs ; distinct facial keel, but base of antennae not widely separated ; margin of mouth somewhat raised, with narrow epistoma above.

Mesonotum : second *dc* long, in ratio 9 : 11 with first, at level of *sa* ; *acr* short, in approximately ten rows ; four hairs at level of first *dc*.

Wing : length in male 2·7–3·2 mm. ; costa extending strongly to *m1* + *2*, *r-m* slightly distad of midpoint of discal cell, last and penultimate segments of *m4* in ratio 25 : 30.

Legs : t2 with two strong bristles.

Colour : an all black species ; frons and orbits matt, ocellar triangle only weakly shining ; mesonotum blackish with tendency to grey, moderately shining, abdomen rather more shining, with faint metallic tinge ; wings hyaline, squamae grey, fringe dark brownish-black.

Holotype ♂, Belgian Congo : N. Kivu, Kibati, 11.xii.1933 (*De Wulf*), in Musée Royal du Congo Belge, Tervuren. *Paratype*, 1 ♂ : Parc National Albert, Cratère Mugunga, 1933 (*De Wulf*), in author's collection.

Melanagromyza setulifera sp. n.

A species with uniformly spaced orbital setulae, extending to between upper ors and verticals, and very widely spaced ori.

Head (fig. 44) : frons slightly wider than eye, in ratio 15 : 12, not projecting above eye in profile ; two equal ors, close together ; two equal ori only slightly weaker than ors ; distance between ori double that between ors ; orbital setulae fine but long, extending uniformly from before lower ori to midway between upper ors and verticals ; ocellar triangle small, narrow, extending to lower ors ; lunule large, higher than a semicircle, reaching slightly above lower ori ; cheeks linear, jowls deepest in centre, one-seventh height of eye ; third antennal segment broader than long, with slight pubescence ; arista bare, equal in length to width of eye ; eye length : width ratio 25 : 20.

Mesonotum : 2 + 0 strong *dc*, second two-thirds length of first, at level of *sa* ; *ia* strong but shorter than second *dc* ; *i.pa* minute, similar to *acr* ; *acr* in ten rows, four rows continuing to beyond first *dc*.

Wing : length in female 3 mm. ; costa extending to *m1* + *2*, *r-m* at mid pointof discal cell, last segment of *m4* in ratio 20 : 35 with penultimate.

Colour : frons matt black, orbits and vertical triangle only slightly shining, black ; lunule dark, blackish-grey ; mesonotum blackish-green, abdomen shining-green ; squamae conspicuously white, margins scarcely darker, fringe white ; veins dark brown.

Holotype ♀, Madagascar : Périnet, xii.1955 (*B. R. Stuckenberg*), in Institut de Recherches Scientifiques de Madagascar.

Melanagromyza solanidis sp. n.

A gall-causer on *Solanum* spp. (Wallace, 1939).

Head : frons wider than eye, in ratio 13 : 10, not projecting above eye in profile ; orbital bristles strong, two equal ors curving upwards, two slightly weaker ori, incurved ; distance below ors slightly wider than between lower ors and upper ori, distance between ori slightly wider than between ors ; orbital setulae sparse, one or two in front proclinate, otherwise reclinate, extending from before lower ori only to lower ors ; ocellar triangle

broad, tapering, extending to below lower ors ; no small hairs at base of ocellar bristles ; lunule relatively small, higher than semicircle ; cheeks linear, jowls deepest in front, together one-sixth height of eye ; eye length : width ratio 20 : 18 ; third antennal segment rounded, broader than long, arista distinctly pubescent, equal in length to width of eye.

Mesonotum : 2 + 0 *dc*, second three-quarters length of first, slightly before level of *sa* ; *acr* in ten rows, only two rows extending beyond first *dc* ; *ia* slightly weaker than second *dc* ; *i.pa* scarcely stronger than *acr*.

Wing : length in male 2·5 mm. ; costa extending to *m1* + 2, *r-m* at midpoint of discal cell, last segment of *m4* in ratio 16 : 28 with penultimate.

Legs : t2 with two postero-dorsal bristles.

Colour : frons matt blackish-brown, orbits and ocellar triangle shining-black ; mesonotum conspicuously shining, dark, blackish-green ; abdomen shining, brighter green ; wings conspicuously hyaline, veins pale-brown, squamae white, margins orange, fringe golden-ochreous.

Holotype ♂, Uganda : Kampala, 20.viii.1921, *ex* galls *Solanum* sp. (Katengotengo). *Paratype* ♂, Kampala, 20.ii.1933, *ex* galls *Solanum melongena* L. (brinjal) (both *H. Hargreaves*), both in British Museum (Nat. Hist.).

Melanagromyza spungaberensis sp. n.

Head : frons equal to width of eye, not projecting above eye in profile ; two equal ors ; two weaker, equal ori, the lower directed inwards ; orbital setulae reclinate, relatively long, in single row from before lower ori to upper ors ; ocellar triangle scarcely detectable when viewed from front, weakly shining, extending to midway between ors when viewed from behind ; orbits not greatly differentiated ; lunule broad, upper margin forming semicircle ; cheeks linear, jowls very narrow, one-twentieth height of eye ; vibrissa strong, equal to lower ori, peristomal hairs weak ; third antennal segment small, rounded, without conspicuous pubescence ; arista long, bare, equal to vertical height of eye ; eye length : width ratio 20 : 15.

Mesonotum : 2 + 0 *dc*, second slightly in front of *sa* ; *acr* coarse, in eight rows, ending before first *dc*.

Wing : length 2·2 mm. ; costa extending to *m1* + 2, *r-m* slightly beyond midpoint of discal cell, last segment of *m4* in ratio 14 : 22 with penultimate.

Legs : t2 with one postero-dorsal bristle.

Colour : frons matt black, orbits and ocellar triangle weakly shining ; mesonotum shining-black, abdomen slightly more matt ; wings hyaline, veins dark ; squamae grey, fringe black.

Holotype ♀, Mozambique : near Spungabera, 21.i.1955 (*B. R. S. and P. G.*) ; *allotype* ♂, S. Rhodesia : Mt. Selinda, Chirinda Forest, 25.i.1955 (*B. R. S. and P. G.*), both in Natal Museum, Pietermaritzburg.

Melanagromyza stuckenbergi sp. n.

Head (fig. 45) : frons at foremost ocellus twice width of eye ; orbits raised above plane of frons and substantially projecting above eye in profile, widening anteriorly and at midpoint of lunule, each one-third width of distance between margins of eye ; lunule high and narrow, constricted at midpoint by orbits ; two strong ors, the upper directed upwards and slightly outwards, the lower directed upwards and inwards ; four ori in two pairs, all directed inwards ; the upper pair set further from eye margin than ors, the lower pair set still further inwards on inner margin of widest point of orbits ; orbital setulae thick, all proclinate, extending from lower ors to below lower ori, those in front longer and directed

inwards ; ocellar triangle slightly rounded at apex, extending to midway between upper pair of ori ; antennae separated by raised facial keel, third segment large, round, with rather conspicuous pubescence ; arista equal in length to width of eye, bare ; cheeks forming narrow ring below eye, jowls deepest in centre, together with cheeks one-fifth height of eye ; eye only slightly elongated, length : width ratio 25 : 20.

Mesonotum : three *dc*, second normal, at level of supra-alar ; third half length of second, slightly forward of midpoint between second and suture ; *ia* strong, only slightly shorter than second *dc* ; *i.pa* small, twice length of *acr* ; *acr* thick, in ten rows, six rows reaching to beyond first *dc*.

Wing : length 2·7 mm. ; costa extending to *m1* + 2, *r-m* at midpoint of discal cell, last segment of *m4* slightly less than two-thirds penultimate, in ratio 2 : 3·5 ; all veins strong, well-defined.

Legs : front tibia with one postero-dorsal bristle, mid-tibia with two.

Colour : frons matt blackish-brown ; orbits and ocellar triangle slightly shining ; mesonotum shining, bluish-black, abdomen similar but somewhat more coppery ; squamae dirty white, with pale brown margins and long but fine white fringe.

Holotype ♂, MADAGASCAR : Manjakatompo forest station, i.1956 (*B. R. Stuckenberg*) ; *allotype* ♀, same data, both in Institut de Recherches Scientifiques de Madagascar

Melanagromyza suborbitalis sp. n.

Head (fig. 46) : frons broad, twice width of eye, slightly but distinctly raised above eye in profile ; three ors, directed predominantly upwards, three ori directed inwards ; ors equidistant and lower two equal (the upper missing on both sides) ; ori also equal, slightly weaker than ors ; orbital setulae fine but relatively long, extending uniformly from lower ori to upper ors ; ocellar triangle large, extending to lower ors ; lunule broad, higher than semi-circle, rounded above, furrowed in centre ; cheeks only slightly projecting at base of antennae, forming narrow ring below eye ; jowls conspicuous, flat below eye, one-seventh height of eye ; vibrissa surrounded by numerous smaller peristomal hairs, which also extend along margin of jowls ; length : width eye ratio 30 : 22 ; mouth margin not raised, facial keel low ; third antennal segment broad, flattened below, rounded at end, with upcurved pubescence ; arista conspicuously long, equal to height of eye, with slight pubescence.

Mesonotum : 2 + 0 *dc*, second at level of *sa* (first missing on both sides) ; *ia* strong, slightly weaker than second *dc* ; *acr* conspicuously thick, in twelve rows, several hairs extending beyond first *dc*.

Wing : length in female 3·7 mm. ; costa extending to *m1* + 2, *r-m* well beyond centre of discal cell, last and penultimate segments of *m4* in ratio 20 : 35.

Legs : t2 with two strong bristles.

Colour : frons matt black, ocellar triangle weakly shining ; mesonotum and abdomen shining-black ; wings with distinct brownish tinge ; veins brown ; squamae grey, margins and fringe black.

Holotype ♀, BELGIAN CONGO : Rutshuru, 2.vi.36 (*L. Lippens*), in Musée Royal du Congo Belge, Tervuren.

I also refer to this species a male from S. RHODESIA : Mount Selinda, Chirinda Forest, 25.i.55, in the Natal Museum, Pietermaritzburg. It has only two ors and is smaller, but otherwise agrees closely with the type.

This species bears some resemblance to *M. parvisetula* sp. n. but is distinguishable by the longer orbital setulae, narrower jowls, lack of epistoma, brownish-tinged wings and conspicuously long arista.

Melanagromyza theae (Green)

Agromyza theae Green, 1896.

Madagascar : Tananarive, Tsimbazaza, bred from leaf-mines on *Camellia thea* Link.

These specimens were referred to *M. flacourtiae* by Séguy (1951), but until this group is further clarified it is felt they should correctly be referred to the specific tea leaf-miner. *M. theae* was redescribed by de Meijere (1922), who also gave a detailed description of the larva (1940).

The species has not yet been recorded from Africa itself.

Melanagromyza vignalis sp. n.

Head : frons at upper ors only slightly wider than eye (13 : 11), not projecting above eye in profile ; two equal ors directed upwards, two weaker, equal ori directed inwards ; orbital setulae small, reclinate apart from one or two hairs in front, from below lower ori to upper ors ; ocellar triangle large, extending to midway between lower ors and upper ori ; lunule higher than a semi-circle ; orbits widening slightly at midpoint of lunule ; length : width eye ratio 28 : 20 ; antennae closely adjoining, third segment rounded but longer than broad, pubescence short ; arista equal in length to width of eye ; cheeks linear, jowls narrow, one-twelfth height of eye, deepest in front.

Mesonotum : 2 + 0 *dc*, second only slightly more than half length of first, conspicuously behind level of *sa* ; *ia* slightly shorter than second *dc* ; *i.pa* similar to *acr* ; *acr* in eight rows, four rows only at first *dc*.

Wing : length in female 2·7 mm., in male 2·4 mm. ; costa extending to *m1* + *2*, first cross-vein at mid-point of discal cell, last segment of *m4* half length of penultimate or slightly longer.

Colour : frons matt black ; ocellar triangle and orbits shining-black ; mesonotum and abdomen shining coppery-green ; squamae and fringe conspicuously silvery-white ; wing-veins pale-brown.

Puparium : dark orange-brown, 3·5 mm. × 1·3 mm. ; posterior spiracular processes (fig. 47) set on a substantial rounded projection on anal segment, each process consisting of a raised pedestal, conspicuously darker than the anal projection, with an ellipse of 12 buds surrounding the central scar ; the two processes separated by twice their own diameter.

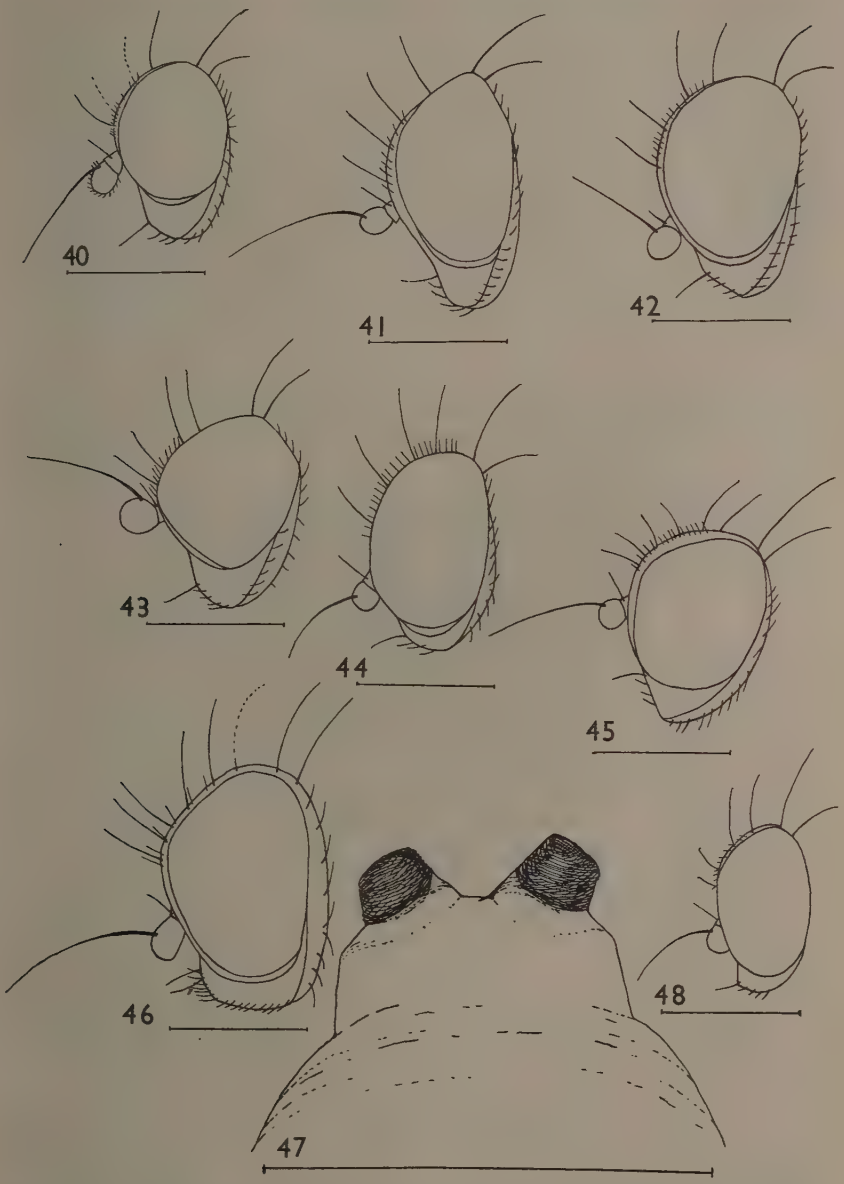
Holotype ♀, French Sudan : *ex* seeds *Vigna* sp. (*R. Dugast*), in British Museum (Nat. Hist.) ; *allotype* ♂ and 1 ♂ *paratype*, Sierra Leone : Njala, 24.xii.1932, *ex* pods and seeds *Vigna catjang* Walp. (*R. Hargreaves*), deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.) ; 1 ♂ *paratype*, same data, in author's collection.

Melanagromyza vigneae Séguy, 1951

A leaf-miner on *Vigna* spp. and possibly other Leguminosae.

Madagascar : Tsimbazaza, bred from leaf-mines on *Vigna angivensis* Baker ; holotype in Muséum National d'Histoire Naturelle, Paris. Séguy also refers to this species specimens bred from leaf-mines on *Phaseolus mungo* L., *Cassia occidentalis* L. and *Crotalaria incana* L. ; confirmation from the early stages that these are indeed the same species is desirable.

Senegal : bred from leaf-mines on *Vigna unguiculata* (L.) Walp.S.lat. (" niebe "), 20 specimens in British Museum (Nat. Hist.).



FIGS. 40–48.—*Melanagromyza:* (40) *pubescentis* sp. n., head; (41) *ruandae* sp. n., head; (42) *rutshurensis* sp. n., head; (43) *setulana* sp. n., head; (44) *setulifera* sp. n., head; (45) *stuckenbergi* sp. n., head; (46) *suborbitalis* sp. n., head; (47) *vignalis* sp. n., posterior spiracles of puparium; (48) *wulfi* sp. n., head.

The author obtained leaf-mines which appear to belong to this species, on *Cassia bicapsularis* L. at Dakar in August, 1957.

In view of the cursory original description the species is redescribed as follows:

Head : frons broader than eye, in ratio 8 : 5, slightly narrowing anteriorly, not projecting above eye in profile ; two equal ors directed upwards ; two weaker, equal ori, the upper directed upwards, the lower inwards ; distance between ors one and a half times that between lower ors and upper ori ; orbital setulae reclinate, sparse, only two or three isolated hairs between lower ori and upper ors ; ocellar triangle well-defined, apex extending in narrow point to lower ors ; lunule small, lower than semi-circle, upper margin largely flat ; jowls broad and wide, deepest in centre, one-seventh height of eye ; cheeks forming distinct ring below eye ; well defined vibrissa equal to lower ors, peristomal hairs weak ; eye conspicuously elongated, length : width ratio 15 : 9 ; third antennal segment small, round with inconspicuous pubescence ; arista relatively long, in ratio 12 : 9 to eye width, with inconspicuous pubescence.

Mesonotum : two *dc*, second two-thirds length of first, distinctly in front of *sa* ; *acr* in six rows, sparse between first and second, none behind first *dc*.

Wing : length in male 1·5 mm., in female 1·8 mm. ; costa extending to *m1* + *2*, *r-m* at anterior third of discal cell, last segment of *m4* normally equal to penultimate, in some specimens slightly shorter.

Legs : t2 with one weak bristle.

Colour : frons matt black, ocellar triangle and orbits distinctly shining ; lunule dark grey, jowls matt brown ; mesonotum blackish-grey, somewhat shining but distinctly matt, abdomen brilliantly shining-black ; wings clear, hyaline, veins brown ; squamae grey, margins and fringe black.

Melanagromyza viridissima sp. n.

A large brilliant green species.

Head : frons equal in width to eye, not projecting above eye in profile ; two ors directed upwards, two ori directed inwards and upwards ; orbital setulae fine, sparse, relatively long, from upper ors to before lower ori, all reclinate apart from one or two hairs in front ; cheeks linear, jowls abnormally narrow, one-tenth height of eye ; eye large, length : width ratio 3 : 2 ; ocellar triangle pointed at apex, extending to lower ors; lunule large, semi-circular ; base of antennae adjoining, not separated by keel, third segment round, with distinct pubescence, arista conspicuously plumose, slightly longer than width of eye.

Mesonotum : 2 + 0 *dc* (broken), second at level of *sa* ; *ia* large ; *i.pa* similar to *acr* ; *acr* in twelve rows, regular in front, extending irregularly in six rows to first *dc*.

Wing : length in female 3·3 mm. ; costa extending to *m1* + *2*, *r-m* at midpoint of discal cell, last segment of *m4* only slightly longer than half penultimate.

Colour : frons matt blackish-brown, orbits and ocellar triangle distinctly shining ; lunule pale grey ; mesonotum and abdomen brilliant metallic green ; wing unusually transparent, veins pale brown ; squamae whitish, fringe white.

Holotype ♀, S. Rhodesia : Shangani, De Beer's Ranch, v.1932, deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.).

Melanagromyza wulfi sp. n.

Head (fig. 48) : frons relatively broad, ratio with eye 12 : 9, very slightly projecting above eye in profile ; two strong equal ors, two weaker equal ori (on one side three) ; distance between ors twice that between ori ; orbital setulae rather long, all proclinate, extending from front ori to hind ors ; ocellar triangle short, rounded, but outline visible, extending to midway between ors ; cheeks linear, jowls narrow, one-tenth height of eye.

Mesonotum : 4 + 0 *dc*, second abnormally long, in ratio 18 : 20 with first, third half

length of second, fourth only slightly smaller; second before level of *sa*, distance between first and second twice that between second and third; fourth, third and second equidistant; on one side small fifth *dc* before suture; *ia* strong, two-thirds length of second *dc*; *i.pa* twice length of *acr*; *acr* coarse, in six rows, two hairs only at first *dc*.

Wing : length 2·7 mm.; costa extending to *m1* + *2*, *r-m* slightly beyond midpoint of discal cell, last segment of *m4* two-fifths penultimate.

Legs : t2 with two postero-dorsal bristles.

Colour : head predominantly matt blackish-brown; ocellar triangle with only slight shine in upper, well-defined section; orbits faintly shining; mesonotum black, shining but somewhat matt; squamae dark-grey, margins and fringe black; legs black, somewhat shining; abdomen shining-black; wings hyaline, veins black.

Holotype ♀, Belgian Congo: Kibati, 1933 (*De Wulf*), in Musée Royal du Congo Belge, Tervuren; *allotype* ♂, Nyiragongo (2300 m.), 1933 (*De Wulf*), in author's collection.

Puparia referable to this genus from a number of leaf-mines collected by Buhr in the Cameroons in 1938 have been studied by de Meijere (1940). As many new species appear to be represented in this material, brief details are given below:

sp. 1. Larval mine in base of flower of *Lissochilus* ? *horsfallii* Batem. (Orchidaceae); pupation in mine. Moluko plantation, 12.iii.1938.

sp. 2. Upper surface linear mine on *Solanum melongena* L.; puparium whitish. Buea, Lower Farm, 850 m., 23.v.1938.

sp. 3. Upper surface linear mine on *Vernonia amygdalina* Del. ("bitter-sticks"); puparium yellowish. Buea, in garden of A. F. C.

sp. 4. Linear mine on *Piper* sp.; puparium yellow. Between Buea and Musake Hut on Mt. Cameroon, 28.v.1938.

sp. 6. Linear mine of *Lissochilus* ? *horsfallii* Batem. Moluko plantation, 27.iii.38.

sp. 7. Mine on *Hypericum* sp. Mannesquelle Hut, 2300 m., 7.v.1938.

sp. 8. Stem mine on *Rubus pinnatus* Willd. Near Max Köhler Hut at Bibundi crater, 4.v.1938.

sp. 9. Upper surface linear mine on *Cardiospermum grandiflorum* Sw.; puparium yellowish. Buea, 19.iii.1938.

sp. 10. Linear mines on *Bryophyllum* sp.; puparium whitish. Musake Hut on Mt. Cameroon, 8.v.1938.

sp. 11. Upper surface, silvery-white linear mine on Rhamnaceae sp. Buea, May and June, 1938.

sp. 12. Linear mines on *Pleiopeltis* sp. and *Asplenium auriculatum* (Thnb.) Kuhn; puparia brownish-yellow. Buea, 1500 m., 28.v.1938.

sp. 13. Upper surface linear mine on *Ipomaea* sp. Moluko, 11.iii.1938.

sp. 14. Mine on Cucurbitaceae sp.; puparium dark-brown. Buea, 11.vi.1938.

sp. 15. Mine on epiphyte of cocoa. Moluko, 11.iii.1938.

sp. 17. Upper surface linear mines on *Arisaema* sp. Buea, 1700 m., March–April, 1938.

sp. 18. Red lower surface mine on unidentified bush. Mt. Cameroon, 16.vi.1938.

sp. 19. Upper surface linear mine on Cucurbitaceae sp.; puparia brown to black. Buea, 14.v.1938.

5. **Ophiomyia** Braschnikov

The majority of known species of the genus *Ophiomyia* are true miners on stems; some are leaf-miners.

The species are almost all uniformly black and are extremely difficult to separate morphologically. Some 23 species are known from the Palaearctic Region and 14 in North America. One species, *O. cornuta* de Meij., of a small group having white squamae, appears to be widespread in the Pacific and is recorded here for the first time in the Ethiopian Region; a second, new species of this group is described, together with five further new species.

In 1958 *O. lantanae* (Froggatt) was deliberately introduced into Kenya to assist in the control of *Lantana spp.*, in the seeds of which the larva feed.

The species may be identified with the following key:

1 Squamae and fringe white 2
– Squamae dark grey, fringe black 3
2 Last segment of *m4* equal to penultimate; *m4* and *m–m* largely white **albivenis***
– Last segment of *m4* three-fifths penultimate; all veins brown **cornuta** de Meijere
3 Vibrissal angle acute, less than 45°; facial keel broad, bulbous . **acutalis***
– Vibrissal angle 80°–90° 4
4 Jowls narrow, at most one-sixth height of eye 5
– Jowls broader, one quarter to one fifth height of eye 7
5 Facial keel narrow between antennae, not greatly widening below; *acr* ending before first *dc*; last segment of *m4* only slightly shorter than penultimate. Small species, wing length 1·9 mm. . . . **verdalis***
– Facial keel widely separating base of antennae; last segment of *m4* two-thirds length of penultimate; *acr* extending to first *dc*. Larger species, wing 2·3 mm. 6
6 Facial keel practically flat between antennae, without furrow above **labiatalis***
– Facial keel conspicuously bulbous between antennae, distinct furrow above . . . . . **lantanae** (Froggatt)
7 Second cross-vein less than own length from first; orbital setulae short; jowls one quarter height of eye; facial keel conspicuously widening between antennae . . . . . **rhodesiensis***
– Second cross-vein own length removed from first; orbital setulae long; jowls one-fifth height of eye; facial keel narrow . . . . **nigerrima***

Ophiomyia acutalis sp. n.

Head (fig. 49): frons one and a half times width of eye, not projecting above eye in profile; two ors directed upwards, the upper slightly stronger, two equal ori directed inwards, equal to lower ors; orbital setulae in uniform row from lower ori to upper ors; ocellar triangle extending to lower ors; lunule inconspicuous, upper margin a straight line immediately above base of antennae; cheeks very prominent below eye, extending beyond third antennal segment, almost to margin of jowl; jowls greatly elongated, front angle acute, approximately 30°; antennae short, separated by broad bulbous keel (fig. 50), scarcely constricted by base of antennae and without central furrow; arista fine, bare, equal to width of eye; eye large, length : width ratio 16 : 12.

* Described below as new.

Mesonotum : 2 + 0 *dc*, second at level of *sa* ; *acr* coarse in six rows, not extending back beyond second *dc* ; *i.pa* short, only slightly longer than *acr*.

Wing : length in female 2·4 mm. ; costa extending to *m1* + *2*, last segment of *m4* slightly shorter than penultimate.

Colour : all black ; frons matt, orbits faintly shining, ocellar triangle somewhat more so ; mesonotum largely shining, with slight matt undertone ; abdomen shining black ; wings hyaline ; squamae grey with black borders and fringe.

Holotype ♀, Belgian Congo : Lac Kivu, Rwankwi, xii.1951 (*J. V. Leroy*), in Musée Royal du Congo Belge, Tervuren.

This species resembles *O. achilleae* Hg., 1937, but the jowls are more elongated, the facial keel broader, more bulbous, and *m–m* at least its own length removed from *r–m*.

Ophiomyia albivenis sp. n.

Head (fig. 51) : frons slightly wider than eye, in ratio 10 : 8, distinctly projecting above eye in profile from base of antennae to back of head ; two ors and two ori, all relatively short and slender, all equidistant ; all four bristles confined to upper half of orbits, lower ori at midpoint between *vt* and base of antennae ; orbital setulae exceptionally sparse, a few hairs below lower ori, apparently lacking above ; ocellar triangle prominent, extending to upper ori ; orbits well-defined ; lunule broad and high ; cheeks forming distinct ring but uniform and not widening below eye ; jowls prominent, almost one-third height of eye, forming angle of 90° in front corner ; (both antennae missing) ; facial keel broad and bulbous, widest point at base of antennae, very slightly decreasing in width below, slightly widening above, without central furrow (fig. 52).

Mesonotum : 2 + 0 *dc*, second two-thirds length of first, at level of *sa*, both relatively short ; *acr* in eight rows, only a few scattered hairs behind second *dc*.

Wing (fig. 53) : length in female 1·7 mm. ; costa extending to *m1* + *2*, *r–m* at anterior third of discal cell, last and penultimate segments of *m4* equal.

Colour : frons matt black, jowls more brownish ; ocellar triangle moderately shining black, orbits weakly shining ; mesonotum conspicuously shining black, abdomen similar ; wings conspicuously pale ; *m4*, *m–m* and basal section *r4* + *5* almost white, other veins pale brown ; squamae and fringe white.

Holotype ♀, South Africa : Cape Province, Graaf Reinet, x.1931 (*Miss A. Mackie*), deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.).

This species is similar to *O. cornuta* de Meij. in having the squamal fringe white, but it is immediately recognisable by the equal segments of vein *m4* and the partially white veins.

Ophiomyia cornuta de Meijere, 1910

Chagos Islands : Salomon Atoll, Ile de Passe, bred from leaf-mines on *Scaevola koenigii* Vahl, 1905 (Lamb, 1912).

Lamb refers to the single available specimen as *Agromyza* sp. but examination has shown it to be an *Ophiomyia* sp., as suggested by the original description.

Frick (1953) described *Ophiomyia scaevolae* bred from leaf-mines on *Scaevola frutescens* (Mill.) Krause from Canton Island in the Pacific. This belongs to the small group in which the fringe of the squamae is white. Two species, *O. leucolepsis* Bezzi, 1928, from Fiji and *O. cornuta* de Meij. from Indonesia, have previously been described from this group.

In order to clarify the association of these species I have examined the types of *O. cornuta* de Meij. and *O. leucolepsis* Bezzi and a paratype of *O. scaevolae* Frick. I am satisfied that the latter are both synonymous with *cornuta* de Meij., the synonymy of which is thus as follows :

Ophiomyia cornuta de Meijere, 1910
Ophiomyia leucolepsis Bezzi, 1928, **syn. nov.**
Ophiomyia scaevolae Frick, 1953, **syn. nov.**

The specimen described by Bezzi, which is stated to be a male, is in fact a female.

The species thus occurs widely in the Pacific area across to Indonesia and the Indian Ocean.

O. cornuta can be readily distinguished from the true Ethiopian species, *O. albivenis* sp. n. from South Africa, which also has a white squamal fringe, by its shorter last segment of vein *m4* and the darker veins.

Ophiomyia labiatalis sp. n.

Head (fig. 54) : frons slightly wider than eye, in ratio 12 : 9, not projecting above eye in profile ; two equal ors, two weaker equal ori ; upper ori directed upwards or slightly inwards, the lower inwards ; orbital setulae short, reclinate, from lower ori to upper ors ; ocellar triangle tapering, narrow, apex scarcely reaching lower ors but narrow groove continues from apex to margin of lunule ; jowls forming angle of 80 degrees below eye, one-seventh height of eye ; cheeks conspicuous below eye, half depth of jowls ; eye length : width ratio 20 : 15 ; base of antennae broadly separated by facial keel, which widens below but is only slightly bulbous ; no furrow in lunule above facial keel ; third antennal segment with distinct pubescence, arista bare.

Mesonotum : 2 + 0 *dc*, second at level of *sa* ; *ia* two-thirds length of second *dc* ; *i.pa* slight, twice length of *acr* ; *acr* coarse in six rows, two hairs at level of first *dc*.

Wing : length 2·3 mm. ; costa extending to *m1* + *2*, costal segments 2 : 3 : 4 in ratio 45 : 10 : 10 ; last and penultimate segments of *m4* in ratio 16 : 24 ; *m–m* further removed from *r–m* than own length.

Colour : frons matt black ; ocellar triangle and orbits weakly shining ; mesonotum largely shining black, with matt undertone ; abdomen shining black ; legs black ; wings hyaline, veins blackish-brown ; squamae grey, fringe black.

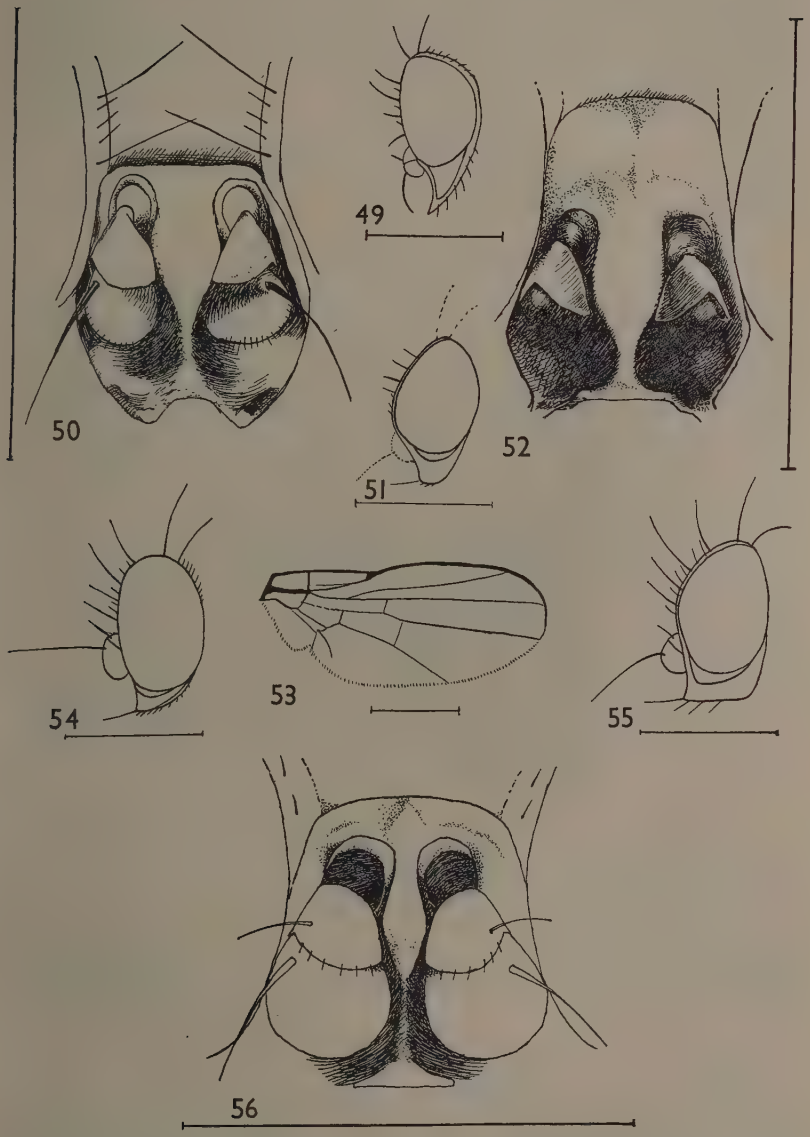
Holotype ♀, *allotype* ♂, CAMEROONS : Mt. Cameroon, Max Köhler Hut, 1600 m., 3.v.1938, bred from stem mine on Labiatae sp. (*Buhr*), in Zoologisches Museum der Humboldt-Universität, Berlin.

This species closely resembles the Palaearctic *O. labiatarum* Hg., 1937. The significant differences are the more conspicuous cheeks in the Ethiopian species and the more bulbous keel below the antennae in the Palaearctic species. De Meijere (1940 : 173) described the puparium of the new species and noted that the posterior spiracular processes each have only three buds, whereas the European species has seven.

Ophiomyia lantanae (Froggatt)

Agromyza lantanae Froggatt, 1919.

As this paper goes to press, information has been received from the Commonwealth Institute of Entomology that *Ophiomyia lantanae* was introduced into



FIGS. 49–56.—*Ophiomyia :* (49) *acutalis* sp. n., head ; (50) the same, facial keel ; (51) *albivenis* sp. n., head ; (52) the same, facial keel (third antennal segment missing) ; (53) the same, wing ; (54) *labiatalis* sp. n., head ; (55) *nigerrima* sp. n., head ; (56) the same, facial keel.

Kenya in June, 1958, with specimens from Hawaii. The larvae feed in the seeds of *Lantana* spp. and have proved a useful factor elsewhere in limiting the spread of this plant pest. Since its introduction nine months ago the fly has been found at Nakuru and Naivasha, 50 and 100 miles respectively from the original liberation site and thus appears to have successfully established itself.

The species most closely resembles *O. labiatalis*, but is immediately distinguishable by the conspicuously bulbous keel between the antennae and the distinct furrow above.

Ophiomyia nigerrima sp. n.

Head (fig. 55): frons twice width of eye, projecting slightly but uniformly above eye in profile; two strong ors, the upper slightly longer; two ori directed predominantly inwards, weaker but equal in length to lower ors; the two ors and upper ori equidistant, distance between ori slightly less; orbital setulae relatively long, from below ori to beyond upper ors; ocellar triangle large, apex extending to lower ors; lunule large, conspicuous, upper margin slightly flattened; jowls forming angle of 90 degrees at front, not projecting beyond antennae; cheeks distinct below eye, extending slightly less than half distance from eye margin to lower margin of jowls; jowls + cheeks equal to one-fifth vertical height of eye; eye length : width ratio 20 : 14; facial keel narrow, not constricted by bases of antennaé and scarcely widening below, not greatly raised, without any central furrow (fig. 56); very narrow epistoma present; third antennal segment wider than long, arista inconspicuously plumose, slightly shorter than eye width.

Mesonotum: 2 + 0 *dc*; *acr* coarse, in eight rows, two rows only at first *dc*; *i.pa* twice length of *acr*; *ia* slightly weaker than second *dc*.

Wing: length in female 2·7 mm.; costa extending to *m1* + *2*, first cross-vein at anterior third of discal cell, *m–m* own length removed from *r–m*, last segment of *m4* short, in ratio 17 : 28 with penultimate.

Colour: frons matt black, ocellar triangle and orbits weakly shining; mesonotum somewhat shining black but with distinct matt undertone; abdomen shining black; wings somewhat darkened, veins strong and dark; squamae grey, with darker margins and black fringe.

Holotype ♀, KENYA: Teita Hills, viii.1947 (*Van Someren*), presented by Commonwealth Institute of Entomology to British Museum (Nat. Hist.).

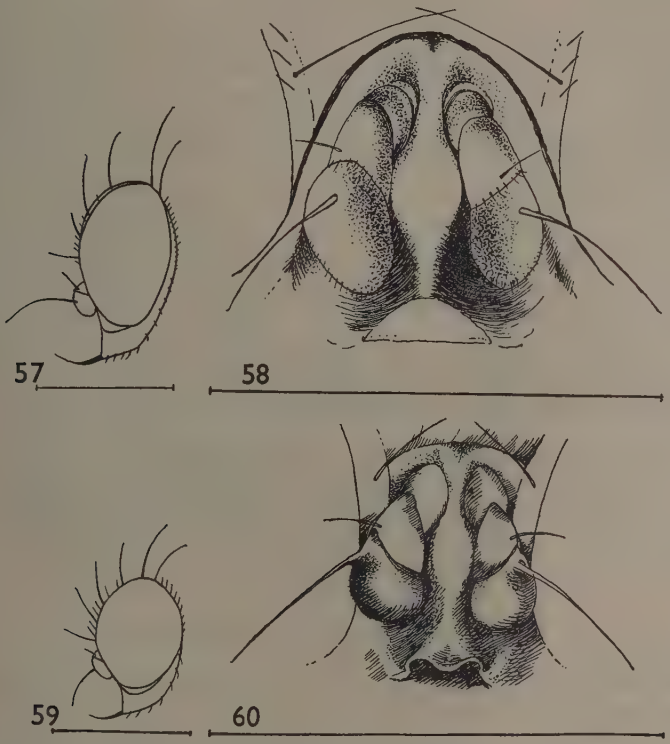
A second female is tentatively referred to this species, from Chyulu Hills, 5600 feet, vii.1938 (*Coryndon Museum Expedition*).

This species closely resembles *O. rhodesiensis* sp. n., but is distinguishable by the narrower facial keel, longer orbital setulae, narrower jowls, greater distance separating the first and second cross-veins and the darker wings and veins.

Ophiomyia rhodesiensis sp. n.

Head (fig. 57): frons twice width of eye, in profile only slightly projecting above eye; two strong ors directed upwards, the upper slightly longer; two weaker ori directed inwards, and slightly upwards; distance between ors slightly greater than between ori and upper ori and lower ors; orbital setulae short, sparse, from before lower ori to midway between ors; ocellar triangle large, apex extending to lower ors; lunule conspicuous, upper margin forming semicircle; jowls broad, forming angle of 80 degrees at front, extending only up to base of antennae, not beyond eye margin; male with well-defined vibrissal horn; cheeks prominent below eye, extending half distance between eye margin and lower

margin of jowls ; jowls + cheeks equal to one-quarter vertical height of eye ; eye length : width ratio 20 : 14 ; facial keel narrow between bases of antennae, conspicuously widening into a well-defined protuberance, then again narrowing to narrow epistoma above mouth margin (fig. 58) ; third antennal segment short, wider than long, with slight pubescence ; arista bare, slightly longer than eye width.



FIGS. 57–60.—*Ophiomyia :* (57) *rhodesiensis* sp. n., head ; (58) the same, facial keel ; (59) *verdalis* sp. n., head ; (60) the same, facial keel.

Mesonotum : 2 + 0 *dc*, second at level of *sa* ; *acr* short, in eight rows between second *dc*, reduced to two rows between first *dc* ; *i.pa* slight, twice length of *acr* ; *ia* two-thirds length of second *dc*.

Wing : length in male 2·4 mm. ; costa extending to *m1* + *2*, *r–m* at anterior third of discal cell, *m–m* less than own length from *r–m*, last segment of *m4* shorter than penultimate, in ratio 18 : 22.

Colour : all black ; frons matt, ocellar triangle moderately shining, base of orbital bristles slightly shining ; mesonotum predominantly shining, with only slight matt undertone ; abdomen shining black ; wings hyaline, veins pale, brownish ; squamae whitish-grey, margins darker, fringe brownish-black.

Holotype ♂, RHODESIA : Chilenga, 22.v.1913, presented by Commonwealth Institute of Entomology to British Museum (Nat. Hist.).

This species closely resembles *O. melandryi* de Meij., 1924, but the ori are shorter, the cheeks not projecting in profile, the facial keel is narrower, the *acr* more numerous, and the *ia* distinctly shorter.

Ophiomyia verdalis sp. n.

Head (fig. 59) : frons wider than eye, in ratio 10 : 7·5, not projecting above eye in profile ; two ors, the upper stronger ; two equal ori, the upper directed upwards, the lower predominantly inwards ; orbital setulae long, sparse, reclinate, from lower ori to upper ors ; ocellar triangle extending to lower ors, orbits not pronounced ; jowls forming angle of 80 degrees below eye, one-sixth height of eye ; cheeks broad in front below eye, almost half depth of jowls ; eye length : width ratio 17 : 12 ; facial keel narrow where separating base of antennae, slightly widening below but scarcely bulbous, nowhere with central furrow (fig. 60) ; lunule small, flat ; third antennal segment with slight pubescence, arista largely bare.

Mesonotum : 2 + 0 *dc*, second before level of *sa* ; *ia* only slightly shorter than second *dc* ; *i.pa* only slightly shorter than *ia* ; *acr* irregular, in six rows, ending before first *dc*.

Wing : length in male 1·9 mm. ; costa extending to *m1* + *2*, costal segments 2 : 3 : 4 in ratio 35 : 8 : 8, last and penultimate segments of *m4* in ratio 15 : 17, *m–m* closer to *r–m* than own length.

Colour : frons matt black ; ocellar triangle distinctly shining, orbits not at all ; mesonotum largely shining black, with slight matt undertone, abdomen more shining ; legs entirely black ; wings hyaline, veins blackish-brown ; squamae dark grey, fringe black.

Holotype ♂, Cape Verde Islands : Nicolau, Rib. Pulgo, 11–18.xii.1953 (*H. Lindberg*), in Museum Zoologicum Universitatis, Helsinki.

A second specimen in poor condition is referred to this species from Cape Verde Islands : Antão, Chã de Morte, 6.i.1954.

Ophiomyia sp.

Cameroons : Mount Cameroon, 2500 m., puparium in stem mine in *Sonchus angustissimus* H. Lindb. (de Meijere, 1940).

It seems probable that this is a species distinct from the several Palaearctic species forming stem mines in Compositae.

6. **Cerodontha** Rondani

This is a small genus hitherto represented by ten species from the Palaearctic and Nearctic Regions and two species from New Zealand (Harrison, 1959). One species is now recorded from the Ethiopian Region.

Cerodontha denticornis (Panzer)

Three single specimens have been examined.

Uganda : the typical dark form *nigroscutellata* Strobl.

Belgian Congo (Kamogobe) : lighter than the extreme light form *semivittata* Strobl, known from Europe. The mesonotum, scutellum and the entire lateral area of the thorax are a dull brownish-yellow, but in all other characters the specimen agrees with *denticornis*.

South Africa (Natal) : an intermediate form, close to *semivittata*.

New to Ethiopian Region : widespread throughout the Holarctic Region.

7. **Phytobia** Lioy

This relatively large genus, consisting of ten well-defined sub-genera, is now represented in the Ethiopian Region by ten species in the five sub-genera *Dizygomyza* Hendel, *Poëmyza* Hendel, *Calycomyza* Hendel, *Icteromyza* Hendel and *Amauromyza* Hendel. Six of these species are described below as new to science.

The species can be identified by the following key :

0	Halteres entirely pale, yellowish-white	1
–	Halteres predominantly dark, brown . . . . . (*Amauromyza*) **triseta***	
1	Lunule conspicuously large, antennae widely separated at base (*Dizygomyza*) **kivuensis***	
–	Lunule smaller, antennae approximate or only slightly separated . .	2
2	Lunule conspicuously higher than a semicircle	3 (*Poëmyza*)
–	Lunule lower, approximately in form of semicircle	6
3	Orbits and antennae entirely yellow . . . . . **setariae***	
–	Orbits dark, brown or black, antennae black	4
4	Notopleural triangle yellow . . . . . **magnificans***	
–	Notopleural triangle dark, brownish	5
5	Last segment of *m4* two-thirds length of penultimate . **caricivora** Groschke	
–	Last segment of *m4* equal to penultimate . . . . . **pubicata***	
6	Antennae approximate	7 (*Calycomyza*)
–	Antennae distinctly separated	8 (*Icteromyza*)
7	Squamal fringe white, abdomen entirely black. Small species, wing length 1·7 mm. . . . . **humeralis** (v. Roser)	
–	Squamal fringe black, front tergites laterally yellow. Large species, wing length 3·4 mm. . . . . **gigantissima***	
8	Femora yellow . . . . . **piliseta** (Becker)	
–	Femora black, yellow only at knees . . . . . **geniculata** (Fallén)	

Phytobia (*Poëmyza*) *caricivora* Groschke, 1954

I refer to this species a series of 30 specimens from the Cameroons bred from *Carex* sp. by Buhr, in the Zoologisches Museum, Berlin.

The specimens agree closely with the paratypes of Groschke's species in my possession, particularly in the following significant characters :

High, narrow lunule and widening orbits above the antennae ; pale brown tibiae and tarsi ; lighter coloration of the humeral callus and notopleural area ; presence of pale patches at the corners of the mesonotum adjoining the scutellum ; pale brown veins.

The puparium of the Cameroons specimens has been described and figured by de Meijere (1940 : 174) as *Dizygomyza* sp., and the unique arrangement of the posterior spiracles appears to be identical with that of European specimens.

The African specimens, however, do differ in a number of characters which should be recorded :

The wing length is consistently about 2·7 mm., whereas in European specimens the size is normally about 3·5 mm., in infrequent cases reduced to 3 mm. ; the squamal fringe is consistently dark-brown, as also is the margin of the squamae (Groschke (1954) emphasised the colour variation in this species of this normally constant character, but in European

* Described below as new.

specimens the squamal fringe is normally light); the scutellum is consistently paler, almost brownish, contrasting with the shining-black mesonotum.

New to Africa; previously only recorded from Germany.

Phytobia (Icteromyza) geniculata (Fallén)

Agromyza geniculata Fallén, 1823.

South Africa: Pietermaritzburg, 21.xii.1954, a single specimen in Natal Museum.

New to Africa; widespread throughout the Holarctic Region.

Phytobia (Calycomyza) gigantissima sp. n.

Head (fig. 61): frons wide, one and a half times width of eye, not projecting above eye in profile; two strong ors, two ori and a small third hair in front (all missing but detectable from well-defined basal pits); distance between lower ors and upper ori and between all three ori equal, that between ors slightly greater; orbital setulae fine, sparse; ocellar triangle conspicuously flat at apex, not reaching upper ors; lunule semi-circular, normal; cheeks just detectable as narrow ring below eye, jowls prominent, forming distinct angle at deepest point below eye, here one quarter height of eye; eye length : width ratio 24 : 20; well-marked epistoma present, facial keel inconspicuous, bases of antennae approximate (third antennal segment missing).

Mesonotum: 3 + 1 strong *dc* (all except first on one side missing but detectable from distinct basal pits); second at level of *sa*, slightly nearer to third than to first, third and fourth equidistant before and behind suture; *acr* irregular in five rows; *prsc* present but scarcely stronger than *acr*.

Wing: length in male 3·4 mm.; *r–m* just basad of mid-point of discal cell, at oblique angle to *m1* + *2*, last segment of *m4* twice length of penultimate.

Colour: frons and jowls conspicuously bright orange-yellow; vertex to upper orbits broadly deep-black, dark colour narrowing below ors but continuing along eye margin to lower ori; both ors on black, ori on yellow but bases dark; epistoma yellow, face above brown; humeral callus blackish-brown in centre but broadly yellow behind continuing to notopleural triangle; humeral bristle at boundary of brown and yellow; narrow black band below anterior notopleural bristle; mesopleuron predominantly black but upper and hind margins bright yellow, yellow continuing to base of wing; other pleura black; narrow yellow band at upper margin of hypopleura; mesonotum black, largely matt but with some subshine; indistinct yellow patch at hind-corners, adjoining scutellum; legs uniformly black, including all knees, but base of coxae yellow; abdomen shining black but first and second tergites broadly, third narrowly orange-yellow at sides; wings hyaline, veins strong and dark; squamae whitish-grey, margin and fringe black.

Holotype ♂, Belgian Congo: Tshibinda, viii.1931 (*Miss A. Mackie*), deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.).

Phytobia (Calycomyza) humeralis (v. Roser), 1840

Cameroons: bred from *Erigeron* sp. and *Dicrocephala* sp. (Buhr).

De Meijere (1940 : 175) described the larva and puparium of the above specimens and found that they agreed closely with European examples of *humeralis*. I have examined three flies bred from each food-plant, now in the

Zoologisches Museum, Berlin, and have confirmed that they do belong to this species.

New to Africa ; widespread throughout the Holarctic Region.

Phytobia (Dizygomyza) kivuensis sp. n.

Head : frons not projecting above eye in profile ; very wide, slightly over twice width of eye ; orbits broad, slightly raised above frons ; orbital bristles at inner margin, conspicuously distant from margin of eye ; two ors directed upwards, the upper distinctly stronger ; two ori, the upper directed inwards and upwards, the lower entirely inwards ; ori equal to upper ors ; orbital setulae sparse but well-defined, uniformly reclinate, from below lower ori to upper ors ; ocellar triangle conspicuous but short, rounded at end, not extending below upper ors ; lunule large, slightly higher than a semicircle, extending to upper ori, rounded above ; antennae separated at base, third segment small, round, with distinct pubescence on upper corner ; cheeks linear, jowls forming distinct angle below eye ; one strong vibrissa, equal to ori, row of strong peristomal hairs along entire margin of jowls.

Mesonotum : 3 + 1 strong *dc* ; all approximately equidistant, fourth over half length of third ; *acr* in six regular rows at third *dc*, extending with three or four irregular hairs to midway between first and second *dc* ; two weak *prsc* present, scarcely twice length of *acr*.

Wing (fig. 62) : length in female 2·4 mm. ; costa well-developed to *m1* + 2, *r–m* before mid-point of discal cell, last segment of *m4* shorter than penultimate, in ratio 20 : 23.

Colour : frons matt brown, with trace of yellow undercolour ; orbits shining black ; ocellar triangle shining black, surrounded by narrow yellowish border in plane of frons ; lunule grey ; antennae uniformly black ; mesonotum predominantly shining black, but somewhat matt when viewed from front ; notopleural area black with trace of yellow undercolour ; mesopleura shining black, with bright yellow upper margin, which extends down half length of hind-margin ; abdomen entirely shining black ; legs predominantly dark ; femora black, knees on fore-legs yellow, on mid-legs scarcely differentiated ; tibiae brownish-black, tarsi brownish-yellow ; wings hyaline, veins pale-brown ; squamae grey, margins and fringe black.

Holotype ♀, Belgian Congo : Lac Kivu, Rwankwi, xii.1951 (*J. V. Leroy*), in Musée Royal du Congo Belge, Tervuren.

Phytobia (Poëmyza) magnificans sp. n.

Head (fig. 63) : frons relatively broad, ratio to eye width 13 : 11, not projecting above eye in profile ; two strong ors directed upwards, the upper only slightly stronger ; two ori directed inwards, the upper equal to lower ors, the lower slightly weaker ; orbital setulae long, sparse, six hairs on one side, eight on other, extending from before lower ori to upper ors ; ocellar triangle rounded at end, reaching to upper ors ; orbits broad, well-defined, widening below lower ors to maximum width at upper ori, here each representing one-third width between eye margins, then again narrowing to base of antennae ; lunule high, reaching almost to lower ors, narrow, only one-third width between eye margins at broadest point of orbits ; cheeks distinct as narrow ring below eye ; jowls slightly elongated at rear, one-fifth height of eye ; vibrissa strong, equal to upper ori, peristomal hairs slender, one-third length of vibrissa ; eye length : width ratio 20 : 15 ; third antennal segment slightly broader than long, rounded at end.

Mesonotum : 3 + 1 strong *dc*, second and third decreasing equally, each two-thirds length of previous one, third and fourth equal ; all four approximately equidistant, third and fourth equidistant each side of suture ; *acr* long, irregularly in six rows, some hairs extending to between second and first *dc* ; *prsc* well-defined, slender ; *i.pa* equal to third *dc* ; *ia* longer, intermediate between second and third *dc*.

Wing : length in female 3·6 mm. ; costa extending to *m1* + *2*, *r–m* at basal third of discal cell, *m–m* only slightly beyond termination of *r1*, last segment of *m4* appreciably longer than penultimate, in ratio 43 : 25.

Colour : frons matt black ; orbits differentiated, slightly more greyish, lunule greyish-brown ; antennae entirely matt black, face black but slightly shining, jowls somewhat brownish ; mesonotum greyish-black, largely matt but with distinct subshine ; humeral callus black in front of the bristle, bright yellow behind, the yellow continuous through entire notopleural triangle to base of wing ; mesonotum yellow in upper and hind margin, otherwise black, pteropleura largely black but with narrow yellow margin with mesonotum ; triangular area below squamae yellow, small area indistinctly yellow in lower angle between sternopleura and hypopleura ; legs black, all knees broadly bright yellow ; abdomen shining black but first to fourth tergites with narrow, bright yellow borders ; squamae pale yellow, margins and fringe dark, brown ; wings hyaline, veins pale brown.

Holotype ♀, Belgian Congo : Parc National Albert, gite Nyiragongo, 2300 m., 1933 (*De Wulf*), in Musée Royal du Congo Belge, Tervuren.

Phytobia (*Icteromyza*) *piliseta* (Becker), **comb. nov.**

Agromyza piliseta Becker, 1903.
Agromyza pubicornis Lamb, 1912, **syn. nov.**

Specimens have been examined from the Cape Verde Islands, Rhodesia and also Lamb's types from the Seychelles. All agree closely, the only significant variation being in the degree of darkening of the third antennal segment. In the Cape Verde specimens the third antennal segment is predominantly black but distinctly yellow on the lower part of the innerside ; in the Rhodesian specimen it is slightly less dark ; in the Seychelles specimens there is a variation from dark-brown on the outer side and yellow inside in the female type to almost entirely yellow in the two male paratypes.

Becker's specimens from Spain, which I have examined in the Naturhistorisches Museum, Vienna, are identical to the Cape Verde specimens.

Phytobia (Poëmyza) pubicata sp. n.

Head (fig. 64) : frons not projecting above eye in profile, almost one and a half times width of eye ; two equal ors directed upwards ; two equally strong ori, the lower directed inwards ; orbital setulae sparse, regular, from below lower ori to upper ors ; ocellar triangle small, rounded at end, not elongated beyond foremost ocellus, raised above plane of frons ; frons rising anteriorly and forming distinct projection above lunule, this relatively broad but high, extending to upper ori ; cheeks forming narrow ring below eye ; jowls prominent, deepest in centre, one-third height of eye ; antennae separated by narrow facial keel, third segment small, round, with conspicuous upcurved pubescence.

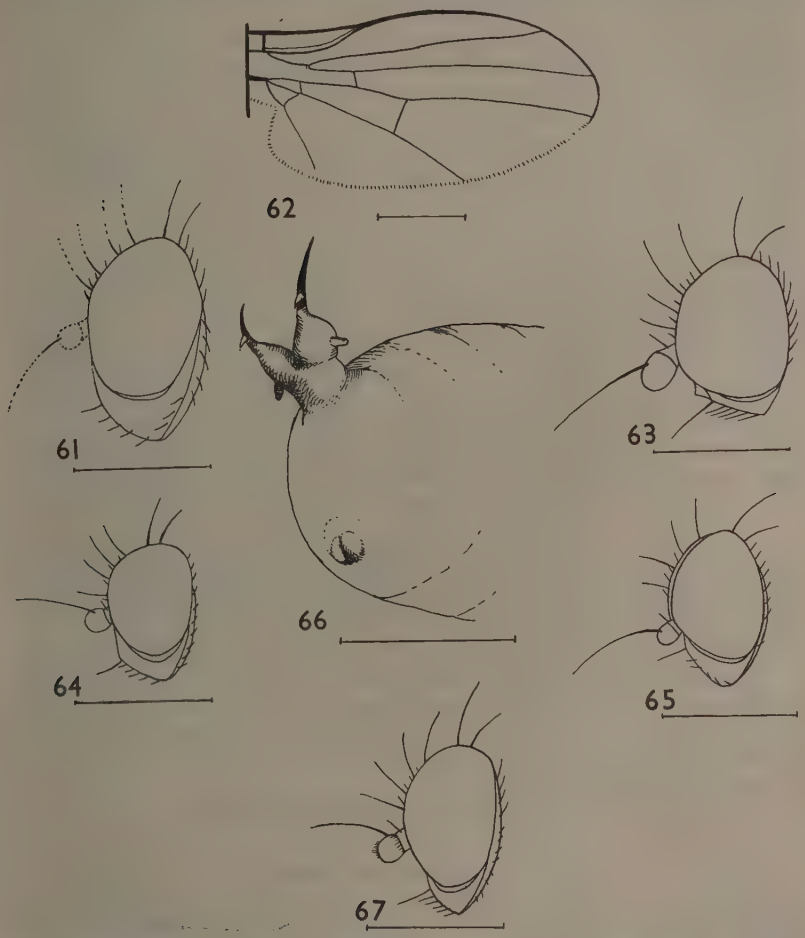
Mesonotum : 3 + 1 *dc*, the fourth pre-sutural bristle scarcely longer than *acr*, first, second and third *dc* equidistant, decreasing in size uniformly, third half length of first ; second at level of *sa* ; *ia*, *i.pa* equal to third *dc* ; well-developed *prsc* present, also equal to third *dc* ; *acr* irregular, in eight rows, sparse between first and second *dc*.

Wing : length in male 2·2 mm. ; costa well-developed to *m1* + *2*, *r–m* at mid-point of discal cell, last segment of *m4* equal to penultimate.

Legs : t2 with one postero-dorsal bristle.

Colour : frons matt dark-brown, clearly differentiated from the shining blackish orbits ; ocellar triangle weakly shining, black ; lunule dark-grey ; antennae black ; face and jowls brownish-grey ; mesonotum black, predominantly shining ; humeral callus and noto-

pleural area distinctly lighter than mesonotum above and shining-black mesopleuron below ; other pleura dark, blackish-brown ; lower margin of notopleural area and hind-margin of mesopleura distinctly yellow ; legs predominantly dark, blackish-brown, tibiae and tarsi



FIGS. 61–67.—*Phytobia :* (61) (*Calycomyza*) *gigantissima* sp. n., head ; (62) (*Dizygomyza*) *kivuensis* sp. n., wing ; (63) (*Poëmyza*) *magnificans* sp. n., head ; (64) (*P.*) *pubicata* sp. n., head ; (65) (*P.*) *setariae* sp. n., head ; (66) the same, posterior spiracles of puparium ; (67) (*Amauromyza*) *triseta* sp. n., head.

paler brownish ; knees on fore legs pale, yellowish, on mid and hind legs uniformly dark ; wings hyaline, veins pale brown ; squamae, together with wing base, yellow, fringe conspicuously dark-brown.

Holotype ♂, BELGIAN CONGO : Rutshuru, i.1934 (*De Wulf*), in Musée Royal du Congo Belge, Tervuren.

Phytobia (Poëmyza) setariae sp. n.

A species with broad, yellow differentiated orbits and yellow antennae.

Head (fig. 65): frons just less than twice width of eye, sunk below orbits, orbits visible in profile as narrow ring above eye; two equal ors directed upwards; two ori directed upwards and inwards, the upper equal to ors, the lower substantially weaker; orbits conspicuously differentiated from vertex to base of antennae, increasing in width to below lower ori and then again narrowing around base of antennae; at widest point orbits occupy four-fifths of distance between eye margins; the ors set in centre of orbits, ori distinctly further removed from eye margin; orbital setulae sparse but conspicuously long, irregularly in two rows from lower ori to lower ors; ocellar triangle small, rounded at end, not reaching upper ors; lunule narrow, very high, extending to lower ors, constricted by the broadened orbits; cheeks forming distinct ring below eye, jowls deepest below centre of eye, ratio to height of eye 4 : 18; vibrissa strong, equal to upper ori, peristomal hairs long.

Mesonotum: 3 + 0 clearly defined *dc*; second half length of first, third half length of second, scarcely twice length of coarse *acr*; these in six to eight rows; *prsc* lacking.

Wing: length 2·2 mm.; costa extending strongly to *m1* + *2*; *r–m* oblique, at basal third of discal cell, last segment of *m4* equal to penultimate.

Colour: orbits, cheeks, jowls conspicuously bright yellow, frons and lunule black; ocellar triangle black, narrowly bordered by yellow; all antennal segments yellow; palps yellow; mesonotum shining black; pleura black but mesopleura with yellow upper and hind margins; legs—coxae brownish, femora black but distally becoming yellowish for almost half length on *p1* and for distal third on *p2* and *p3*; all tibiae and tarsi brownish-yellow; abdomen shining black, all tergites with narrow yellow hind-margins; wings hyaline, veins brown, pale yellow at wing base; squamae yellowish-white, fringe similar.

Holotype ♂, Sierra Leone: Njala, bred from Gramineae, emerged 1.xi.1928 (*E. Hargreaves*); *allotype* ♀, same data, both deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.). One paratype ♂, same data, in author's collection.

De Meijere (1940 : 175) described and figured the puparium of a *Poëmyza* sp. collected by Buhr, mining sword-grass (= rhinoceros grass), at Buea, Cameroons. It is clear from the characteristic posterior spiracles (fig. 66) that this is the same species as here described. It has not been possible to establish the definite identity of the grass but Buhr has recently stated that, as far as he can recall, it was a *Setaria* sp.

The leaf-mine is unfortunately not available for description.

Phytobia (Amauromyza) triseta sp. n.

Head (fig. 67): frons slightly wider than eye, in ratio 12 : 10, not projecting above eye in profile; two equal ors, two ori, the upper equal to ors, the lower only slightly weaker, both directed inwards and upwards; orbital setulae reclinate, minute, sparse, from lower ori to lower ors; ocellar triangle not extending below lower ocellus; orbits prominent, slightly higher than frons; lunule small, lower than semicircle; cheeks visible as narrow ring below eye; jowls deepest in centre, forming distinct angle, one-fifth height of eye; eye length : width ratio 20 : 17; third antennal segment asymmetric, longer below than above, with fine but not conspicuous pubescence; arista equal in length to width of eye, finely pubescent; mouth margin slightly raised but without epistoma.

Mesonotum: 3 + 0 *dc*, second only slightly shorter than first, at level of *sa*, third in ratio 10 : 14 with second, midway between second and suture; *ia* equal to third *dc*; *i.pa* long, similar; *acr* long, coarse, in six rows, three hairs only midway between first and second *dc*.

Wing : length in male 2·7 mm.; costa extending to *m1* + *2*, *r–m* at anterior third of discal cell, last segment of *m4* longer than penultimate in ratio 28 : 20.

Legs : t2 without postero-dorsal bristles.

Colour : frons matt brownish-black, pale brown in centre, orbits weakly shining, faintly brown adjoining eye margin; mesonotum largely shining black; narrow line at upper margin of mesopleura, notopleural area and small patches at hind corners of mesonotum pale brown; abdomen weakly shining blackish, with faint brown undertone; wings faintly brownish, veins dark; halteres dark brown on inside, pale yellowish-brown outside; squamae grey, margin and fringe black.

Holotype ♂, South Africa: Pietermaritzburg, Town Bush, 2.xi.1954 (*B. R. Stuckenberg*), in Natal Museum, Pietermaritzburg.

8. **Liriomyza** Mik

This large genus, like *Phytomyza* Hendel, is very poorly represented in the Ethiopian Region. A total of only nine species has been recorded and of these four are as yet undescribed, either owing to the inadequacy of the available material or because the species are known only from their leaf-mines.

The genus is the most homogeneous of the Agromyzidae and the adults are extremely difficult to distinguish morphologically. A knowledge of the host-plant and leaf-mine has proved essential for the satisfactory differentiation of the numerous species in the Palaearctic and Nearctic Regions.

Key to the Ethiopian species

1	Adult unknown	8
–	Adult known	2
2	Mesonotum with yellow patch before scutellum	**cordiae***
–	Mesonotum black to margin of scutellum	3
3	Third antennal segment brownish, distinctly darkened	**emiliae** Séguy
–	Third antennal segment yellow	4
4	Upper corner of orbits black, both *vte* and *vti* on black ground; orbits adjoining eye margin black, at least faintly	**brassicae** (Riley)
–	At least *vti* on yellow ground	5
5	Upper corner of orbits entirely yellow, both *vti* and *vte* on yellow ground	6
–	*vte* on black ground, at least arising at boundary of yellow and black	7
6	Head at rear of ocellar triangle black; abdomen entirely black	**melantherae***
–	Semicircle of yellow below ocellar triangle at rear of head; abdomen yellow laterally and tergites with yellow hind-margins	**flavalis***
7	Femora conspicuously yellow	sp. 2 (Natal)
–	Femora predominantly brownish	sp. 4 (Cape Verde)
8	*Leaf-miner on* Clematis ? sinensis *Fres.*	sp. 1 (Cameroons)
–	*Leaf-miner on* Asystasia gangetica *T. Anders*	sp. 3 (Senegal, East Africa)

Liriomyza brassicae (Riley)

Oscinis brassicae Riley, 1884.
Liriomyza crucifererum Hering, 1927.

South Africa: Pretoria, bred from *Tropaeolum majus* L. (*Hering, 1957*). French West Africa: Dakar, bred from *Brassica* sp. (*Spencer*).

* Described below as new.

Senegal : Bambey, bred from *Crucifer* sp.

Cape Verde Islands : Teneriffe, a single caught specimen (*H. Lindberg*).

Mauritius : bred from *Nasturtium* sp.

This species is known as a leaf-miner on many genera of the Cruciferae and occurs widely in the Palaearctic and Nearctic Regions. It has recently been recorded from New Delhi, India.

Liriomyza cordiae sp. n.

A leaf-miner on *Cordia ovalis* R. Br.

Head (fig. 68) : frons not projecting above eye in profile, unusually long and narrow, slightly less than width of eye ; distance from hind margin of head to base of antennae twice that between margins of eyes ; two ors directed inwards and slightly upwards, two ori directed inwards, all equal, distance between ors equal to that between ori, distance between lower ors and upper ori slightly less ; lower orbits below upper ori increasingly raised above eye towards base of antennae ; ocellar triangle short, rounded, extending only to upper ors ; lunule small, higher than semicircle, upper margin at level of lower ori ; cheeks linear below eye, jowls extended at rear, lower margin straight, not rounded, forming angle of 70 degrees below eye ; eye large, length : width ratio 18 : 12 ; third antennal segment relatively large, rounded, without conspicuous pubescence ; arista fine, bare, conspicuously thickened in basal third.

Mesonotum : three distinct *dc*, with four further small hairs anteriorly, two before and two after suture ; first *dc* slightly less than twice length of second, second similarly longer than third ; the four hairs beyond, equal and half length of third *dc* ; second and third *dc* and the four hairs beyond equidistant, distance between second and first *dc* slightly greater ; second *dc* at level of *sa*, first at level of *pa* ; *i.pa* somewhat weaker than second *dc* ; *acr* irregularly in four rows, terminating at second *dc* ; five hairs irregularly placed in *ia* area, no *ia* bristle.

Wing (fig. 69) : length in male 1·6 mm., in female 1·9 mm. ; *r5* terminating at apex of wing, last segment of *m4* twice length of penultimate ; *r–m* at mid-point of discal cell.

Colour : frons, orbits, jowls, antennae orange-yellow ; arista yellowish in thickened base, darker beyond ; margin of head behind eye uniformly yellow, yellow extending downwards to form narrow yellow rim at top of rear of head ; all bristles on head slightly but distinctly yellowish ; mesonotum matt grey, with narrow, yellow rectangular area from second *dc* to scutellum and occupying half area between the two lines of *dc* ; all hairs and bristles blackish ; thorax predominantly yellow, the only black areas being : a narrow band at base of notopleural area and at base of mesopleura, a large triangular area filling the lower four-fifths of sternopleura and hind half of pteropleura ; legs entirely yellow ; all hairs on legs and sides of thorax yellowish ; abdomen largely yellow, with two discontinuous bands of black along the tergites, separated by line of yellow in centre, hairs blackish ; wings hyaline, all veins brownish-yellow, bright yellow at wing base ; squamae bright yellow, fringe ochreous-yellow ; halteres yellow.

Holotype ♂, Tanganyika : Moshi, 31.xii.1934, bred *ex* leaf-mine *Cordia ovalis* R. Br. *ex* D. C. (*A. H. Ritchie*) ; *allotype* ♀, same data, both deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.). One paratype ♀, same data, in author's collection.

Liriomyza emiliae Séguy, 1951

Madagascar : Tananarive, Tsimbazaza, bred from leaf-mine on *Emilia citrina* D. C. Holotype in Muséum National d'Histoire Naturelle, Paris.

The characteristic feature of this species is the darkened third antennal segment, which separates it from all species known from the Ethiopian region.

This darkening is conspicuous in the holotype and two paratypes, less so in seven other paratypes. The wing is figured by Séguy (1951), and Paulian (1953) gives a photograph of the leaf-mine, which shows it to be a highly winding, narrow, upper surface linear mine.

Liriomyza flavalis sp. n.

Head (fig. 70): frons wide, twice width of eye, distance from hind-margins of head to base of antennae slightly less than width at foremost ocellus; frons and orbits not projecting above eye in profile; two equal ors directed upwards and slightly outwards; three ori directed inwards, the upper two not significantly weaker than ors, the lower only three-quarters length of others; ori and lower ors approximately equidistant, distance between ors slightly greater; orbital setulae slight and sparse, five or six only, from below lower ori to lower ors; ocellar triangle short, foremost ocellus above level of upper ors; lunule sunk deeply below plane of frons, upper margin just below level of upper ori; cheeks linear below eye, jowls deep, extended at rear, one-third vertical height of eye; third antennal segment longer than broad, rounded at end, without distinct pubescence; eye length: width ratio 15 : 10.

Mesonotum: 3 + 1 *dc*, second only slightly shorter than first, third and fourth equal, half length of first; distance between first and second twice that between second and third, between third and fourth one and a half times that between second and third; second *dc* at level of *sa*, third immediately behind suture, fourth slightly in front of *prs*; *i.pa* equal to third *dc*; *acr* irregular in four rows, extending to midway between second and first *dc*.

Wing: length in male 2·3 mm.; *r–m* at mid-point of discal cell, last segment of *m4* twice length of penultimate.

Colour: frons, jowls and antennae bright lemon-yellow; *vte* on clear yellow ground, back of head adjoining eye margin for short distance beyond; back of head beneath hind margin of ocellar triangle yellow for depth equal to width of ocellar triangle, yellow forming a semi-circle with the two arms extending up to *vte*; mesonotum largely shining black, only slightly matt; sides of thorax conspicuously yellow; *prs* on yellow ground adjoining black of mesonotum, humeral callus with pale brown bar in centre, yellow extending above to line of *dc*; mesopleura with small brown bar in centre of lower margin, pteropleura narrowly brown above, sternopleura dark brown in lower part, bristle midway between upper margin and line of brown below, hypopleura yellow in lower hind corner, broad yellow area between; coxae and femora uniformly bright yellow, tibiae and tarsi brown, slightly yellowish in fore-legs; abdomen with all tergites laterally distinctly yellow and with narrow yellow borders; wings hyaline, veins dark brown; squamae yellow with brown margin and fringe.

Holotype ♂, South Africa: Pietermaritzburg, 14.xii.1954 (*B. R. Stuckenberg*), in Natal Museum, Pietermaritzburg.

Distinctive features of this species are the yellow at the sides of the prothorax and below the ocellar triangle at the rear of the head.

Liriomyza melantherae sp. n.

Head (fig. 71): frons one and a half times width of eye, not projecting above eye in profile; two ors (missing on both sides), two ori directed predominantly inwards, the lower substantially weaker; orbital setulae extending from lower ori to upper ors, sparse, fine but long; ocellar triangle short, not extending below upper ors; orbits not significantly differentiated, cheeks linear, forming narrow ring below eye; jowls only slightly extended at rear, in centre one-sixth vertical height of eye; eye length : width ratio 3 : 2; third

antennal segment small, rounded, with only slight pubescence ; arista long, only slightly shorter than vertical height of eye.

Mesonotum : 3 + 1 *dc*, second two-thirds length of first, third and fourth small, equal, half length of second ; distance between first and second *dc* somewhat greater than between second and third ; second, third and fourth equidistant ; *acr* coarse, irregularly in four to five rows, extending to midway between second and first *dc* ; *i.pa* long, somewhat shorter than second *dc*.

Wing (fig. 72) : length in male 1·5 mm. ; *r5* terminating at apex of wing, last segment of *m4* three times length of penultimate, *r–m* at midpoint of discal cell.

Colour : orbits and upper angle of head entirely yellow, both *vti* and *vte* on yellow ground ; antennae entirely yellow ; mesonotum shining black, well-defined yellow spots at hind corners adjoining scutellum ; sides of thorax predominantly yellow ; mesopleura almost entirely yellow, with faint narrow black bar at midpoint of lower margin ; large central area of sternopleura black ; lower half of hypopleura black ; legs—femora entirely yellow, tibiae and tarsi brownish-yellow ; abdomen matt black, tergites without yellow margins ; squamae yellowish-grey, with narrow dark margins, fringe pale.

Holotype ♂, CAMEROONS : Debundscha, 14.vi.1938, bred from upper surface linear mine on *Melanthera* ? *brownei* Sch. Bip (*Buhr*), in Zoologisches Museum der Humboldt Universität, Berlin.

The puparium was described and figured by de Meijere (1940 : 176). It is stated that pupation takes place in the mine ; this is, however, so unusual in this genus that confirmation is desirable.

Liriomyza sp. (1)

Leaf-miner on *Clematis* ? *sinensis* Fres.

CAMEROONS : Buea (*Buhr*). Imago not bred ; puparium described by de Meijere (1940 : 177).

Liriomyza sp. (2)

I have examined two specimens from NATAL : Pietermaritzburg (*B. R. Stuckenberg*) in the Natal Museum, which closely resemble *L. strigata* Mg., but I hesitate to refer them definitely to this species in view of the following differences :

Frons more projecting above eye in profile, pleura and legs conspicuously yellower, tergites yellow at sides and hind margins, last segment of *m4* three times as long as penultimate, *m–m* closer than own length to *r–m*.

It seems probable that this is a distinct species but bred material is necessary before this can be safely decided.

Liriomyza sp. (3)

Empty leaf-mines were found by the author on *Asystasia gangetica* (L.) T. Anders in the Hann Botanical Garden, Dakar, on 3.viii.1957. Prof. Hering has confirmed from dead larvae that the mines are of a *Liriomyza* sp. and has mentioned having seen similar mines on the same plant from East Africa.

The mine (fig. 73) is an irregular, upper-surface whitish blotch, with scattered frass.

Liriomyza sp. (4)

I have examined a single specimen from the Cape Verde Islands : Fogo, 19.ii.1954 (*H. Lindberg*) in the University Museum, Helsinki, which closely resembles *L. strigata* Mg. The following differences can be recorded :

Thorax and legs darker, last segment of *m4* three times as long as penultimate ; small species—wing length 1·9 mm.

It seems probable that this is a distinct species.

9. **Phytagromyza** Hendel

This is a relatively small genus with forty Palaearctic and three Nearctic species. The character used by Hendel to separate it from *Dizygomyza* Hendel, now accepted as *Phytobia* Lioy, was the extension of the costa only to vein *r5*. This characteristic is not completely satisfactory, since Hendel himself mentioned two exceptions, *P.* (*Phytobia*) *lunulata* Hd. and *P.* (*Phytobia*) *laticeps* Hd., and Spencer (1957) discovered a further species, *Phytobia* (*Amauromyza*) *madrilena* Spen., in which the costa ends at or shortly after vein *r5*. The relationship between these two genera is further confused by new species discovered by the author in Brazil in 1957, which have not yet been worked out in detail.

De Meijere (1938 : 85) commented on the similarity of some *Phytagromyza* larvae to certain species of *Dizygomyza*. In one of the new species described below, *P. acanthacearum*, he (1940 : 177) commented on the similarity of the larvae to *Pseudonapomyza*, where larva and puparium are covered with characteristic papilli.

Evidence is thus increasing that *Phytagromyza* is not a satisfactory genus and may have to be split among two or more other genera with somewhat widened concepts.

Three species are now recorded for the Ethiopian region ; two are described as new, while the third is transferred to this genus from *Phytomyza*. These species may be recognised from the following key :

1	Second cross-vein lacking, pre-scutellars well-developed	**vernoniae** (Séguy)
–	Second cross-vein present, pre-scutellars absent	2
2	Squamal fringe ochreous-yellow	**acanthacearum***
–	Squamal fringe black	**urundensis***

Phytagromyza acanthacearum sp. n.

Head : frons narrow, equal to width of eye, not projecting above eye in profile ; two strong ors directed upwards, the upper slightly longer ; two ori directed inwards, the upper two-thirds length of ors, the lower significantly weaker ; lower ors conspicuously below centre of frons ; the two ori and lower ors equidistant, distance between ors twice as great ; orbital setulae fine, upright, very sparse, only four visible ; ocellar triangle small, rounded at end, not extending to upper ors ; lunule slightly below plane of frons, higher than semicircle ; orbits pronounced, slightly raised above frons ; cheeks visible as narrow ring

* Described below as new.

below eye, jowls conspicuous, deepest at rear, one quarter height of eye ; length : width eye ratio 17 : 11 ; vibrissa conspicuous, equal to upper ori, peristomal hairs slight ; third antennal segment broader than long, rounded at end, with conspicuous pubescence ; arista long, equal to height of eye.

Mesonotum : 3 + 0 *dc*, second two-thirds length of first, third, which is immediately behind suture, scarcely more than half length of second ; *acr* irregular in six rows ; *ia* slightly longer than *i.pa*, no *prsc*.

Wing (fig. 74) : length 2 mm. ; costa extending to slightly beyond *r5*, second cross-vein just basad of first, discal cell thus small ; last segment of *m4* seven times length of penultimate ; apex of wing between *r5* and *m1* + *2* but nearer the latter, *m1* + *2* weak, scarcely more than a fold.

Legs : *t2* with two small postero-dorsal bristles.

Colour : a predominantly black species ; frons matt, ocellar triangle and orbits shining ; lunule silvery-grey ; face weakly shining black, jowls brownish-black ; legs brownish-black, knees not differentiated ; mesonotum, pleura, abdomen shining black ; wings hyaline, base yellowish ; squamae whitish-yellow, margins not conspicuously darker, fringe brownish-ochreous.

Holotype ♂, CAMEROONS : Tiko, 6.vi.1938, bred from "white-flowered *Acanthaceae* sp." (*Buhr*), in Zoologisches Museum der Humboldt-Universität, Berlin.

The larva and puparium were described by de Meijere (1940 : 177). The species forms an upper surface star-shaped leaf mine, pupating in the mine.

I refer to this species two specimens from TANGANYIKA ; one in Naturhistorisches Museum, Vienna, and one in author's collection, and also one specimen from SUDAN : W. Darfur, deposited in British Museum (Nat. Hist.) by the Commonwealth Institute of Entomology.

Phytagromyza urundensis sp. n.

In the single available specimen the head has collapsed and a full description is not possible. The species closely resembles *acanthacearum* sp. n. and it will suffice to tabulate its characteristics in relation to this species.

urundensis sp. n.	*acanthacearum* sp. n.
Arista : conspicuously plumose	less so.
Thorax : robust	slender.
dc : three strong *dc*	arrangement similar, but substantially weaker.
Epistoma : broad epistoma present	no epistoma.
acr : coarse	finer.
Wing length : 2·4 mm.	2·2 mm.
Apex : midway between veins *r5* and *m1* + *2* ; ratio of second, third and fourth costal segments 36 : 18 : 10	only slightly before *m1* + *2* ; costal ratio 30 : 14 : 12.
Wings : darkened by coarse microtrichia	clear, hyaline.
Squamae : grey, borders and fringe black	whitish-yellow, borders not darker, fringe ochreous.

Holotype ♀, BELGIAN CONGO : Urundi, Bururi, 1800–2000 m., 5–12.iii.1953, (*P. Basilewsky*), in Musée Royal du Congo Belge, Tervuren.

Phytagromyza vernoniae (Séguy) **comb. nov.**

Phytomyza vernoniae Séguy, 1951.

Head (fig. 75): frons not projecting above eye in profile, equal to width of eye; two ors, the upper slightly stronger; two strong equal ori, equal to lower ors; ors directed upwards, ori inwards; orbital setulae reclinate from lower ori to upper ors; ocellar triangle not extended beyond foremost ocellus; lunule narrow, slightly higher than semicircle; orbits broad, well-differentiated; third antennal segment widening apically, with distinct upcurved pubescence; arista with slight pubescence; jowls prominent, angular, one-quarter height of eye; cheeks forming narrow ring below eye; vibrissa similar to ori, peristomal hairs conspicuously long.

Mesonotum: 3 + 0 *dc*, all strong, diminishing in size equally, equidistant, third well before suture; *acr* coarse in six rows; *prsc* strong, equal to third *dc*.

Wing: costa extending to vein *r5*, *m–m* lacking. (Figured by Séguy (1951).)

Colour: frons matt black in upper half tending to brownish; orbits slightly shining; jowls and antennae matt black; mesonotum shining black; legs entirely dark, femora black, tibiae and tarsi blackish-brown; wing hyaline, veins brown, except *m1* + *2*, which is scarcely more than a fold; squamae greyish, fringe black.

MADAGASCAR: Tananarive, Tsimbazaza, bred from leaf-mines on *Vernonia appendiculata* Less. Holotype and paratypes in Muséum National d'Histoire Naturelle, Paris.

The reclinate orbital setulae and wing venation place this species clearly in the genus *Phytagromyza*.

10 **Pseudonapomyza** Hendel

One further species is now added to this small genus, from the Cape Verde Islands. *P. spicata* (Malloch) is recorded for the first time for the Ethiopian Region.

The marked angle at the upper corner of the third antennal segment, which was hitherto thought to be characteristic of the genus, is lacking in three of the Ethiopian species and the antennae are entirely normal.

P. atra (Mg.), *spicata* (Mall.) and *lacteipennis* (Mall.) are all leaf-miners on Gramineae. *P. alternantherae* (Séguy) is a leaf-miner on Amaranthaceae and *P. hypoestivora* (Séguy) on Acanthaceae; it is thus established that the genus is not limited to the Gramineae, as had previously been believed.

The following key permits identification of the seven world species of the genus:

1 Third antennal segment with characteristic point at upper corner . 2
– Third antennal segment rounded, normal 4
2 Tarsi brownish-yellow . . . . . **lacteipennis** (Malloch)
– Legs entirely black 3
3 Third *dc* little more than half length of and conspicuously close to second; distance between third and second half that between first and second; orbits matt . . . . . **spicata** (Malloch)
– Third *dc* larger, almost equal to second; distance between third and second equal to that between second and first; orbits shining **atra** (Meigen)
4 Halteres entirely dark-brown; wings dull, greyish . . **hypoestis** Hering
– Halteres yellowish-white; wings shining, hyaline 5

5	Mesonotum shining black	6
–	Mesonotum predominantly matt, greyish-black . .	**alternantherae** (Séguy)
6	Well-defined epistoma present	**lucentis***
–	Epistoma lacking	**hypoestivora** (Séguy)

Pseudonapomyza alternantherae (Séguy) **comb. nov.**

Phytomyza alternantherae Séguy, 1951.

I have examined the holotype of this species in Paris and in view of the reclinate orbital setulae it is clearly referable to the genus *Pseudonapomyza*. I redescribe the species as follows :

Head : frons approximately equal in width to eye, not projecting above eye in profile ; two ors directed upwards, the upper distinctly longer ; two ori directed inwards, the upper slightly stronger than lower and equal to lower ors ; the two ori and lower ors equidistant, distance between ors somewhat greater ; orbital setulae minute, reclinate, extending irregularly from before lower ori to upper ors ; ocellar triangle short, extending only slightly beyond foremost ocellus and not reaching upper ors ; lunule small, narrow, slightly higher than semicircle, upper margin midway between ori ; orbits distinct but not widening anteriorly ; cheeks linear, scarcely detectable below eye ; jowls narrow, slightly extended at rear ; eye large, length : width ratio 4 : 3 ; third antennal segment small, rounded, wider than long, with distinct upcurved pubescence ; arista bare, long, equal to length of eye.

Mesonotum : 3 + 0 *dc*, second slightly longer than half first, third slightly longer than half second ; second at level of *sa*, third midway between second and suture ; distance between first and second slightly greater than between second and third ; *ia* and *i.pa* equal, two-thirds length of third *dc* ; *acr* in eight rows in front, extending in six rows to first *dc*.

Wing : length 1·7 mm. ; costa extending strongly to *r4* + *5*, segments 2, 3, 4 in ratio 21 : 12 : 12 ; *m–m* basad of *r–m* ; discal cell open basally ; *m1* + *2* merely a fold.

Legs : t2 with two small postero-dorsal bristles.

Abdomen : epandrium somewhat enlarged.

Colour : frons matt brownish-black ; lunule similar ; orbits and ocellar triangle weakly shining ; jowls brownish, antennae and face black ; mesonotum predominantly matt black but weakly shining when viewed from rear ; pleura black, somewhat more shining ; notopleural area slightly paler, brownish-black ; abdomen shining black ; legs entirely black, tibiae and tarsi only slightly paler ; wings hyaline, veins strong, black ; squamae dark grey, fringe black ; halteres whitish-yellow.

Holotype, Madagascar : Tsimbazaza, bred from leaf-mines on *Alternanthera sessilis* R. B., in Muséum National d'Histoire Naturelle, Paris.

The species was bred by Buhr in 1938 from the same plant at Ekona, Cameroons, and two specimens bred by him from *Achyranthes aspera* L. in the same area are also referred to this species, although the legs and veins are markedly paler.

The larva was described by de Meijere (1940 : 178) ; it has the papillae characteristic of the genus, although the adult lacks the angle on the third antennal segment found in the Palaearctic and Nearctic species.

Pseudonapomyza hypoestis Hering, 1957

South Africa : Natal, bred from *Hypoestes aristata* (Vahl) Roem. and Schultes.

* Described below as new.

Hering placed this species only tentatively in the genus *Pseudonapomyza*, owing to the brown halteres and rounded third antennal segment. The discovery of two further Ethiopian species described in this paper, in which the third antennal segment is without the characteristic angle hitherto associated with the genus, suggests that *hypoestis* is correctly placed generically.

I also refer to this species a single caught specimen from the BELGIAN CONGO : Lac Kivu, in the Musée Royal du Congo Belge, Tervuren.

Pseudonapomyza hypoestivora (Séguy) **comb. nov.**

Phytomyza hypoestivora Séguy, 1951.

Examination of the holotype shows that this species correctly belongs in the genus *Pseudonapomyza* ; it has reclinate orbital setulae and the venation characteristic of the genus, as figured by Séguy (1951).

The essential characteristics of the species are :

Third antennal segment round, without apical angle, no epistoma, orbits weakly shining, mesonotum largely shining black.

The halteres appear to have slight, irregular brownish markings near the join with the stalk, but from the single available specimen it cannot be determined whether this is a constant character.

The species is immediately distinguishable from *P. hypoestis* Hg., from South Africa, which has dark-brown halteres. It most closely resembles *P. lucentis* sp. n., but is distinguishable by the lack of epistoma.

MADAGASCAR : Tsimbazaza, 21.vi.49, bred from leaf-mine in *Hypoestes betsiliensis* S. Moore.

Pseudonapomyza lucentis sp. n.

Head (fig. 76) : frons narrow, only slightly wider than eye, not projecting above eye in profile ; two strong ors directed upwards, lower slightly weaker ; two weaker ori, the upper directed inwards and upwards, the lower predominantly inwards ; distance between ors slightly greater than between lower ors and upper ori and between ori ; orbital setulae minute, sparse, predominantly reclinate but one or two hairs at lower ori proclinate ; ocellar triangle not extended beyond foremost ocellus, not reaching level of upper ors ; lunule small, narrow, but conspicuously higher than a semicircle, extending to midway between ori ; orbits well-defined, slightly widening at and partially enclosing lunule ; cheeks forming low ring below eye, jowls conspicuously elongated at rear, forming distinct angle, one-quarter vertical height of eye ; eye length : width ratio 16 : 13 ; third antennal segment rounded at end, slightly higher than long, with slight pubescence ; arista long, equal to vertical height of eye, minutely pubescent ; mouth slightly projecting, narrow epistoma above ; low facial keel dividing the unusually deep antennal pits.

Mesonotum : 3 + 0 strong *dc* ; second slightly more than half length of first, third (broken) appears to be scarcely less strong than second ; second at level of *sa*, third midway between *sa* and suture ; *ia* strong, *i.pa* weak ; *acr* coarse, irregularly in eight rows between third and second *dc*, only two hairs at level of first *dc*.

Wing (fig. 77) : length in male 1·9 mm. ; costa extending strongly to *r4* + *5*, segments 2, 3, and 4 in ratio 25 : 9 : 14 ; *m–m* basad of *r–m* ; discal cell open basally, united with second basal ; *m1* + *2* merely a fold.

Abdomen : closely covered with coarse hairs ; epandrium small, normal.

Legs : t2 with one strong postero-dorsal bristle.

Colour : frons matt black, orbits and ocellar triangle shining ; jowls matt brown, face shining black ; epistoma light brown ; mesonotum and abdomen wholly shining black ; legs entirely dark—femora and tibiae black, tarsi brown ; wing hyaline, normal ; veins dark brown, not noticeably lighter at wing base ; halteres whitish-yellow ; squamae grey, fringe black.

Holotype ♂, Cape Verde Islands : Nicolau, Chã de Preguisa, 13–17.xii.1953 (*H. Lindberg*), in Museum Zoologicum Universitatis, Helsinki.

Pseudonapomyza spicata (Malloch)

Phytomyza spicata Malloch, 1914.

Cape Verde Islands : 11 specimens from S. Antão (3), Boavista (3), S. Lucia (1), S. Nicolau (2) and S. Vicente (2), xii.1953 and i.1954 (*H. Lindberg*), in Museum Zoologicum Universitatis, Helsinki.

Belgian Congo : Parc National Albert, in Musée Royal du Congo Belge, Tervuren.

South Africa : Transvaal, in British Museum (Nat. Hist.).

Hering kindly compared the Cape Verde specimens with a paratype of *spicata* (Mall.) in the Deutsches Entomologisches Institut, Berlin, and confirmed that they belong to this species.

P. spicata (Mall.) can be readily distinguished from *atra* (Mg.), 1830, by the smaller third *dc*, which is also characteristically close to the second, and by the entirely matt orbits. It was described by Malloch from Formosa and he also recorded it in Fiji and Samoa (Malloch, 1935). Frick (1952) reports that the species has now been recorded from Guam and the islands of Oahu, Mani and Molokai in the Hawaiian group. It is a leaf-miner on corn and sugar-cane and has been reported from, in all, 14 species of Gramineae.

No confirmed records of *P. atra* (Mg.) are known to the author from the Ethiopian Region.

11. **Phytoliriomyza** Hendel

This genus consists of only two species. It is represented in the Ethiopian Region by *P. perpusilla* (Mg.), which occurs throughout the Palaearctic Region but in Europe is noticeably commoner in the Mediterranean area. It is also widespread in the United States.

Phytoliriomyza perpusilla (Meigen), 1830

Cape Verde Islands : Antão, a single specimen taken by the Finnish Expedition in January, 1954, in Museum Zoologicum Universitatis, Helsinki.

New to Africa ; widespread throughout Holarctic Region, commoner in South.

12. **Napomyza** Haliday

As this paper goes to press I have received a small collection of specimens from East Africa, among which is a single specimen of a *Napomyza* sp. n. This species will be described shortly in the *Annales du Musée du Congo Belge*, Tervuren.

13. **Phytomyza** Fallén

This is by far the largest world genus of the Agromyzidae, being represented by some 400 species, the great majority occurring in the temperate zones of the Palaearctic and Nearctic Regions. Only ten species, have so far been recorded from the Ethiopian Region, including three new species described below.

The Ethiopian species can be distinguished by the following key:

1 Scutellum entirely dark 2
– Scutellum at least partially yellow 7
2 *acr* lacking 3
– *acr* present in at least two distinct rows 4
3 *Blotch mine on* Bidens pilosa *L., Madagascar* . . . **bidensivora** Séguy
– *Linear mine on numerous host-plants* . . . . . **atricornis** Meigen
4 At least fore coxae entirely yellow 5
– Coxae all black . . . . . **seneciovora***
5 Femora entirely yellow; second and third antennal segments black **clematidella***
– Femora black with yellow knees 6
6 Second antennal segment yellow; in male epandrium enlarged . **africana***
– Second antennal segment black . . . . . **anonera** Séguy
7 Sternopleura entirely yellow . . . . . **knowltoniae** Hering
– Sternopleura at least dark in centre 8
8 Upper ors strong, equal to lower . . . . . **clematidella***
– Upper ors distinctly weaker than lower or lacking. 9
9 Second costal segment two to two and a half times length of fourth; second antennal segment lighter than third, yellowish **philoclematidis** Hering
– Second costal segment at least three times as long as fourth; second antennal segment dark, black or brown 10
10 Mesopleura yellow only in upper third, above mesopleural bristle; femora predominantly dark, brownish, even though yellow undertone present . . . . . **vitalbae** Kaltenbach
– Mesopleura yellow in upper half; femora pale yellow . . **vitalbella** Hering

Phytomyza africana sp. n.

Head (fig. 78): frons broad, twice width of eye, strongly projecting above eye in profile; two equal ors directed upwards, set at inner margin of orbits; two ori, the upper equal to ors, directed inwards and upwards, the lower weaker, directed inwards; the ori set at centre of orbits and conspicuously nearer eye margin than ors; orbital setulae rather long, in single row from upper ors to slightly in front of lower ori; ocellar triangle not extended below level of upper ors; lunule slightly lower than semicircle, orbits well differentiated; cheeks broadly projecting below eye; jowls deep, extended at rear, two-fifths height of eye; vibrissa strong, equal to upper ori, three long peristomal hairs; eye set obliquely, length : width ratio 15 : 10; third antennal segment large, longer than broad, rounded at end, without distinct pubescence, arista equal to height of eye; distinct epistoma above mouth-margin; palps slightly enlarged, bristles normal.

Mesonotum: 3 + 1 *dc*, third and fourth equal, equidistant before and behind suture, fourth in front of line of *prs*; distance between first and second one a half times that between second and third; *acr* coarse, irregularly in two rows, ending before second *dc*.

* Described below as new.

Wing : length in male 2·8 mm. ; second, third and fourth costal segments in ratio 40 : 15 : 18.

Abdomen : clothed in coarse hairs, in male epandrium greatly enlarged.

Colour : frons, cheeks, jowls and face uniformly bright yellow ; third antennal segment black, first and second bright yellow ; palps black ; *vte* on black ground which continues only for short distance along rear margin of eye ; *vti* on yellow ground, the yellow extending narrowly to rear down back of head ; narrow neck of black joining rear of ocellar triangle to back of head ; mesonotum and pleura matt grey ; upper and hind-margin of mesopleura narrowly yellow. *Legs*—coxae all distinctly yellow ; femora black, broadly yellow at knees ; tibiae yellow adjoining femora but otherwise blackish-brown ; tarsi entirely dark ; abdomen with tergites shining blackish-brown in centre but laterally and on hind-margins broadly yellow ; epandrium shining-black, distinctly greyish-pubescent at end ; wings hyaline, veins pale brown, yellow at wing-base ; squamae yellowish with ochreous fringe ; halteres yellow.

Holotype ♂, Tanganyika : Matengo, W.S.W. of Songea, Ugano, 1500–1700 m., 21–31.i.1936 (*Zerny*), in Naturhistorisches Museum, Vienna.

Phytomyza anonera Séguy, 1951

Madagascar : Tsimbazaza, Tananarive ; bred from leaf-mine on *Vernonia appendiculata* Less. Holotype in Muséum National d'Histoire Naturelle, Paris.

Paulian (1953) states that the mine occurs on the lower surface of the leaf and that the fly emerges in April ; further details of the mine are not given.

The species is distinctive, with bright yellow frons, black second and third antennal segments, yellow coxae, black femora with yellow knees, and the sides of the thorax, including the humeral and notopleural areas and the upper half of the mesopleura, are also bright yellow. There are the normal two upper fronto-orbitals and one lower, and not one upper and two lower, as stated in the original description.

Phytomyza atricornis Meigen, 1838

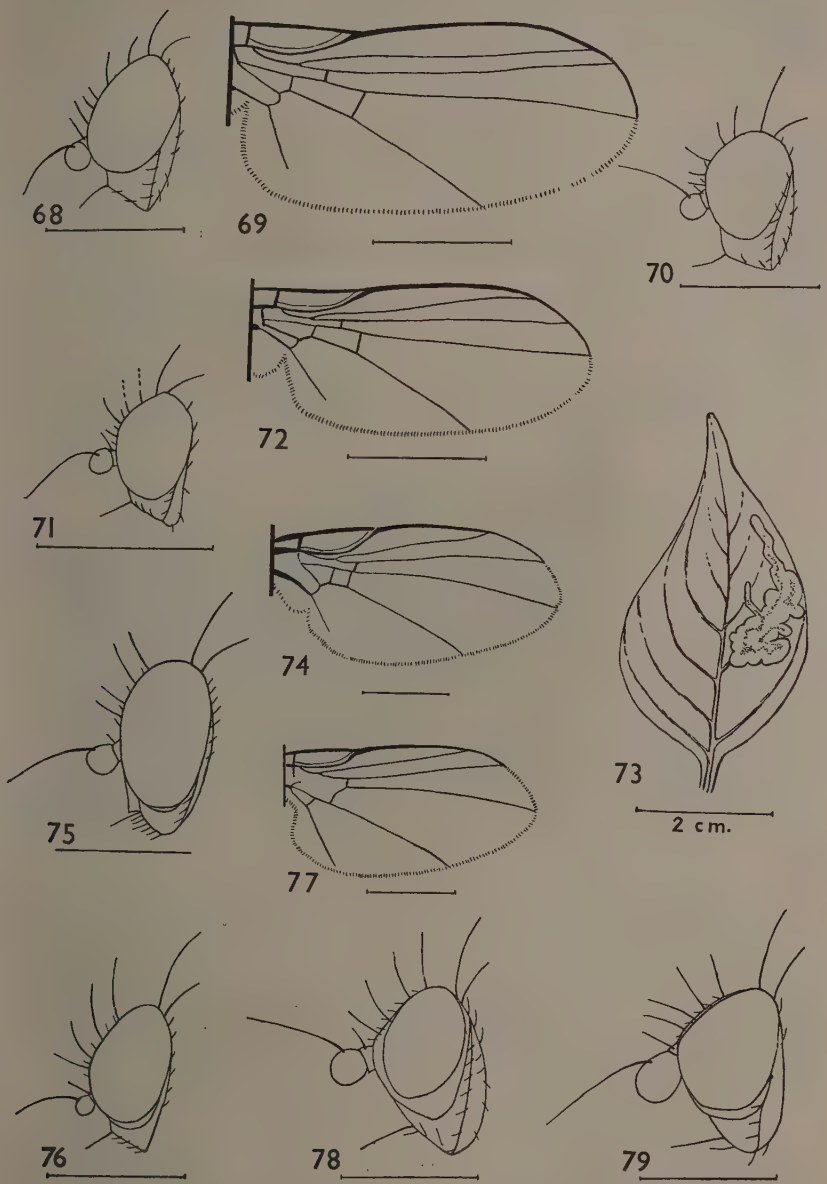
South Africa : apparently widespread. Hering (1957) gives records from Pretoria, Johannesburg and Carolina with eight different host-plants. I have recently examined bred material from the Transvaal Museum, Pretoria, from Pretoria, Durban and, in particular, from the Cape from the following hosts : *Cheiranthus* sp. (wall flower), *Nasturtium* sp., *Brassica* sp., *Linaria* sp., *Petunia* sp., *Lathyrus* sp. (sweet pea), *Pisum* sp. (pea), *Medicago sativa* L., *Sonchus oleraceus* L., *Chrysanthemum tricolor* Andr., *Lycopersicum esculentum* Mill. (tomato) and *Solanum tuberosum* L. (potato).

Belgian Congo, Kenya, Cameroons, Cape Verde Islands—isolated records only.

The species appears thus to be more common in South Africa than in the primarily tropical areas. In the Palaearctic Region it is the most polyphagous

---

Figs. 68–79.—(68–73) *Liriomyza :* (68) *cordiae* sp. n., head ; (69) the same, wing ; (70) *flavalis* sp. n., head ; (71) *melantherae* sp. n., head ; (72) the same, wing ; (73) *Liriomyza* sp., leaf-mine on *Asystasia gangetica* (L.) T. Anders ; (74) *Phytagromyza acanthacearum* sp. n., wing ; (75) *P. vernoniae* (Séguy), head ; (76) *Pseudonapomyza lucentis* sp. n., head ; (77) the same, wing ; (78) *Phytomyza africana* sp. n., head ; (79) *P. clematidella* sp. n., head.



Liriomyza spp.,; *Phytagromyza* spp., *Pseudonapomyza lucentis*; *Phytomyza* spp.
(details on facing page).

and abundant of all the Agromyzidae. The larva forms a characteristic upper or lower surface linear mine, pupating in the mine.

Phytomyza bidensivora Séguy, 1951

MADAGASCAR: Tananarive, Tsimbazaza, bred from leaf-mines on *Bidens pilosa* L. Holotype in Muséum National d'Histoire Naturelle, Paris.

I have examined the holotype and paratypes and they appear identical in every respect with *Phytomyza atricornis* Mg., which occurs widely in South Africa, where its known host-plants include *Bidens pilosa* L. It thus seemed established that *P. bidensivora* was synonymous with the polyphagous and cosmopolitan *P. atricornis*.

The leaf-mine of *P. bidensivora*, however, illustrated by Paulian (1953), is a distinctive blotch; two similar mines are shown in the same leaf. *P. atricornis* produces a narrow linear mine and no exceptions are known to me where a blotch in any way resembling that of *P. bidensivora* has been found.

Until further material and evidence become available I therefore refrain from establishing this synonymy.

Phytomyza clematidella sp. n.

A gall-causer on *Clematis* sp.

Head (fig. 79): frons at foremost ocellus somewhat wider than eye (13 : 10), orbits projecting uniformly above eye in profile; two equal ors; one or two ori, slightly longer than ors (one on one side, two on other); distance between ors slightly greater than between lower ors and upper ori; orbital setulae in single line, relatively long, from before ori to upper ors; ocellar triangle rounded at apex, not extended beyond foremost ocellus; ocellar bristles long, reaching to upper ori; antennae conspicuously large, third segment longer than broad, arista slightly longer than height of eye; eye height : width ratio 20 : 15; cheeks conspicuously deep below eye, jowls elongated at rear, together one-quarter height of eye; vibrissa strong, equal to ori, two or three weak peristomal hairs.

Mesonotum: 3 + 1 *dc*; second at level of *sa* (first destroyed on both sides), third immediately behind suture, and not appreciably weaker, fourth distinctly in front of *prs*, three-quarters length of third; *acr* in two rows, conspicuously long, *ia* not appreciably stronger; humeral bristle surrounded by group of six small hairs; two small hairs on upper margin of mesopleura.

Wing: length 3·1 mm.; costal segments 2, 3, and 4 in ratio 55 : 10 : 20.

Colour: frons bright orange-yellow, orbits, jowls and face paler whitish-yellow; hind-margin of eyes up to base of *vti* brown; first antennal segment yellow, second and third distinctly black; palps black; mesonotum uniformly matt grey; mesopleura predominantly matt grey but with distinct narrow yellow fore, upper and hind margins; legs predominantly yellow, but tibiae and tarsi darker, brownish; wings hyaline, veins pale brown, yellow at wing base; squamae yellowish-grey, margins slightly darker, fringe dark, brownish. (The abdomen in the only available specimen is missing; the scutellum is largely obscured and it is not possible to determine whether it is yellow in centre.)

Holotype, sex indet., KENYA: Ngong, iii.1934, "bred ex galls *Clematis*" (*Van Someren*), deposited by Commonwealth Institute of Entomology in British Museum (Nat. Hist.).

The fragment of the puparium available is pale whitish-yellow. The anterior spiracles are in the form of two long tapering horns 0·3 mm. long and slightly less than their own length apart.

This species is distinctly larger than the two leaf-mining species on *Clematis* described by Hering (1957) from South Africa, *Phytomyza philoclematidis* Hg. and *P. vitalbella* Hg., and can readily be distinguished from them by the strong upper ors and the darker, grey sides of the thorax.

Phytomyza knowltoniae Hering, 1957

South Africa: Capetown, bred from leaf-mine on *Knowltonia capensis* (L.) Huth.

Phytomyza philoclematidis Hering, 1957

South Africa: Pretoria, bred from leaf-mine on *Clematis brachiata* Thbg.

Phytomyza seneciovora sp. n.

This species agrees closely with *P. atricornis* Mg., but is readily distinguishable by the following characters:

Head: frons broader, twice width of eye; the two ors set further away from eye margin than ori; third antennal segment slightly larger with distinct pubescence; jowls deeper, one-third height of eye; hind-corners of upper orbits darker, black, both *vt* on black ground; orbital setulae longer.

Thorax: *acr* present in two irregular rows, extending to second *dc*; mesonotum darker, matt blackish; margins of mesopleura darker, less yellowish.

Wing: veins darker, blackish, wings clear, hyaline, without fuscous tinge.

Holotype ♂, Cameroons: Mannesquelle Hut, 9.v.1938, bred from leaf-mine in *Senecio* ? *mannii* (Hook. f.) Milne-Redhead (*Buhr*), in Zoologisches Museum der Humboldt-Universtät, Berlin.

De Meijere (1940: 184) has described the larva; the mine is referred to as upper-surface, greatly winding, frass for long stretches forming an almost continuous line at side of channel. The puparium remains in the mine and is bright green.

Phytomyza vitalbae Kaltenbach, 1874

South Africa: Natal, bred from leaf-mine on *Clematis brachiata* Thbg. (Hering, 1957).

Phytomyza vitalbella Hering, 1957

South Africa: Natal, bred from leaf-mine on *Clematis brachiata* Thbg.

V. Host Records of Ethiopian Agromyzidae

Vascular Cryptogams

Polypodiaceae

Asplenium auriculatum (Thnb.) Kuhn	*Melanagromyza* sp.
Pleiopeltis sp.	*Melanagromyza* sp.

Monocotyledones

ARACEAE	
Arisaema sp.	*Melanagromyza* sp.
CYPERACEAE	
Carex sp.	*Phytobia* (*Poëmyza*) *caricivora* Groschke
DIOSCOREACEAE	
Dioscorea sp.	*Melanagromyza dioscoreae* Séguy
GRAMINEAE	
Digitaria adscendens Henrard	*Agromyza penniseti* Spencer
Pennisetum purpureum Schum.	*Agromyza penniseti* Spencer
Setaria sp.	*Phytobia* (*Poëmyza*) *setariae* Spencer
LILIACEAE	
Aloe petricola Pole Evans	*Penetagromyza aloes* Spencer
ORCHIDACEAE	
Lissochilus horsfallii Batem.	*Melanagromyza* sp.

Dicotyledones

ACANTHACEAE	
Acanthacearum sp.	*Phytagromyza acanthacearum* Spencer
Asystasia gangetica (L.) T. Anders	*Liriomyza* sp.
Hypoestes aristata (Vahl) Roem and Schultes	*Pseudonapomyza hypoestis* Hg.
Hypoestes betsiliensis S. Moore	*Pseudonapomyza hypoestivora* (Séguy)
ACHARIACEAE	
Ceratiosicyos ecklonii Nees	*Melanagromyza ceratiosicyi* Hg.
AMARANTHACEAE	
Achyranthes aspera L.	*Pseudonapomyza alternantherae* (Séguy)
Alternanthera sessilis R.B.	*Pseudonapomyza alternantherae* (Séguy)
APOCYNACEAE	
Mascarenhasia arborescens A.D.C.	*Melanagromyza* sp.
Pachypodium rutenbergianum Vatke	*Melanagromyza* sp.
ASCLEPIADACEAE	
Cryptostegia madagascariensis Boj.	*Melanagromyza* sp.
BORAGINACEAE	
Cordia ovalis R. Br. ex D. C.	*Liriomyza cordiae* Spencer
Cynoglossum sp.	*Agromyza rufipes* Mg.
CELASTRACEAE	
Cassine sphaerophylla (Presl.) O. Ktze.	*Melanagromyza cassinis* Hg.
Gymnosporia buxifolia (L.) Szyszl.	*Melanagromyza gymnosporiae* Hg.
COMPOSITAE	
Bidens pilosa L.	*Phytomyza atricornis* Mg.
	Phytomyza bidensivora Séguy
Chrysanthemum tricolor Andr.	*Phytomyza atricornis* Mg.
Crassocephalum (= *Gynura*) *sarcobasis* S. Moore	*Melanagromyza gynurae* Spencer

C. (= *Senecio*) *mannii* (Hook f.) Milne-Redhead	*Phytomyza seneciovora* Spencer
Dichrocephala sp.	*Phytobia* (*Calycomyza*) *humeralis* v. Ros.
Emilia citrina D. C.	*Liriomyza emiliae* Séguy
Erigeron sp.	*Phytobia* (*Calycomyza*) *humeralis* v. Ros.
Melanthera ? brownei Sch. Bip.	*Liriomyza melantherae* Spencer
Senecio sp.	*Melanagromyza compositana* Spencer
Sonchus angustissimus H. Lindb.	*Melanagromyza beckeri* Hend.
S. oleraceus L.	*Phytomyza atricornis* Mg.
Vernonia appendiculata Less.	*Phytagromyza vernoniae* (Séguy)
Convolvulaceae	
Ipomaea sp.	*Melanagromyza* sp.
Crassulaceae	
Bryophyllum sp.	*Melanagromyza* sp.
Kalanchoe ? aliciae Hamet	*Melanagromyza* sp.
Cruciferae	
Brassica sp.	*Liriomyza brassicae* (Ril.)
Nasturtium sp.	*Liriomyza brassicae* (Ril.)
Cucurbitaceae	
Cucurbitacearum sp.	*Melanagromyza* sp.
Momordica sp.	Agromyzid sp.
Euphorbiaceae	
Croton subgratissimus Prain	*Melanagromyza philocroton* Hg.
Croton sp.	*Melanagromyza kenyensis* Spencer
Flacourtiaceae	
Flacourtia ramontchi L'Hérit.	*Melanagromyza flacourtiae* Séguy
Goodeniaceae	
Scaevola koenigii Vahl	*Ophiomyia cornuta* de Meij.
Guttiferae	
Hypericum sp.	*Melanagromyza* sp.
Labiatae	
Labiatarum sp.	*Ophiomyia labiatalis* Spencer
Leguminosae-Caesalpinioideae	
Cassia bicapsularis L.	*Melanagromyza* sp.
C. laevigata Willd.	*Melanagromyza* sp.
C. occidentalis L.	*Melanagromyza* sp.
Leguminosae-Papilionoideae	
Cajanus indicus L.	*Melanagromyza chalcosoma* Spencer
Clitoria sp.	*Melanagromyza* sp.
Crotalaria capensis Jacq.	*Melanagromyza crotalariae* Hg.
C. incana L.	*Melanagromyza vigneae* Séguy
C. juncea L.	*Melanagromyza crotalariae* Hg.
Lathyrus sp.	*Phytomyza atricornis* Mg.
Medicago sativa L.	*Phytomyza atricornis* Mg.
Meghania grahamiana (W. and A.) O. Ktze.	
Flemingia rhodocarpa Bak.	*Melanagromyza chalcosoma* Spencer

Phaseolus lunatus L.	*Melanagromyza phaseoli* (Tryon)
P. mungo L.	*Melanagromyza* sp.
P. radiatus L.	*Melanagromyza phaseoli* (Tryon)
P. vulgaris L.	*Melanagromyza phaseoli* (Tryon)
Pisum sp.	*Phytomyza atricornis* Mg.
Vigna angivensis Bak.	*Phytomyza atricornis* Mg.
V. sinensis Endl. ex Hassk.	*Melanagromyza phaseoli* (Tryon)
V. unguiculata Walp.	*Melanagromyza vigneae* Séguy
Vigna sp.	*Melanagromyza vignalis* Spencer
MALVACEAE	
Abutilon sp.	*Agromyza abutilonis* Spencer
Gossypium sp. (cotton)	*Melanagromyza gossypii* Spencer
Malvacearum sp.	*Agromyza malvaceivora* Séguy
MORACEAE	
Bosquiea sp.	*Melanagromyza dicksoni* Hg.
MYRSINACEAE	
Maesa emirnensis A. D. C.	*Melanagromyza* sp.
NYCTAGINACEAE	
Bougainvillea spectabilis Willd.	*Melanagromyza* sp.
PASSIFLORACEAE	
Passiflora coerulea L.	*Melanagromyza passiflorae* Hg.
P. edulis Sims.	*Melanagromyza* sp.
P. foetida L.	*Melanagromyza passiflorae* Hg.
PIPERACEAE	
Piper sp.	*Melanagromyza* sp.
PITTOSPORACEAE	
Pittosporum stenopetalum Bak.	*Melanagromyza* sp.
RANUNCULACEAE	
Clematis brachiata Thbg.	*Phytomyza philoclematidis* Hg.
	P. vitalbae Kalt.
	P. vitalbella Hg.
C. sinensis Fres.	*Liriomyza* sp.
Clematis sp.	*Phytomyza clematidella* Spencer
RHAMNACEAE	
Rhamnacearum sp.	*Melanagromyza* sp.
ROSACEAE	
Rubus pinnatus Willd.	*Melanagromyza* sp.
RUBIACEAE	
Coffea sp.	*Melanagromyza coffeae* (Kon.)
Mussaenda arcuata Poir.	*Melanagromyza* sp.
RUTACEAE	
Citrus sp.	*Melanagromyza citri* Spencer
SAPINDACEAE	
Cardiospermum grandiflorum Sw.	*Melanagromyza* sp.
SCROPHULARIACEAE	
Linaria sp.	*Phytomyza atricornis* Mg.
SOLANACEAE	
Lycopersicum esculentum Mill. (tomato)	*Phytomyza atricornis* Mg.

Petunia sp.	*Phytomyza atricornis* Mg.
Solanum melongena L.	*Melanagromyza solanidis* Spencer
S. tuberosum L. (potato)	*Phytomyza atricornis* Mg.
THEACEAE	
Camellia theae Link.	*Melanagromyza theae* (Green)
TROPAEOLACEAE	
Tropaeolum majus L.	*Phytomyza atricornis* Mg.
VERBENACEAE	
Duranta plumieri Jacq.	*Melanagromyza* sp.
Lantana sp.	*Ophiomyia lantanae* (Froggatt)

VI. Species of Economic Importance Recorded from the Ethiopian Region

Species	Host-plant	Damage caused
Melanagromyza chalcosoma Spencer	*Cajanus indicus* L. and *Flemingia rhodocarpa* Bak.	Larva in seeds—damage possibly considerable.
Melanagromyza citri Spencer	*Citrus* sp.	Leaf-miner — damage probably negligible.
Melanagromyza coffeae (Kon.)	*Coffea* sp.	Leaf-miner — damage probably negligible.
Melanagromyza crotalariae Hg.	*Crotalaria* spp.	Leaf-miner — damage probably slight.
Melanagromyza cunctans (Mg.)	*Pisum* spp.	Internal stem-feeder — plants weakened, possibly destroyed.
Melanagromyza gossypii Spencer	*Gossypium* sp.	Leaf-miner — damage probably negligible.
Melanagromyza kikuyuana Spencer	*Cajanus indicus* L.	Damage possibly considerable.
Melanagromyza phaseoli (Tryon)	*Phaseolus* spp. and *Vigna* spp.	Internal stem-feeder — young plants entirely destroyed.
Melanagromyza theae (Green)	*Camellia thea* Link.	Leaf-miner — damage probably negligible.
Melanagromyza vignalis Spencer	*Vigna* spp.	Larva in seeds—seeds destroyed.
Pseudonapomyza spicata (Mall.)	Sugar, maize	Leaf-miner — damage probably negligible.
Phytomyza atricornis Mg.	Tomato, potato	Leaf-miner — damage probably negligible.

VII. Summary

All known species of Ethiopian Agromyzidae, including species from Madagascar, the Seychelles, Chagos Islands, Mauritius and Rodriguez, and also all available unidentified material from the main museums in Europe and Africa, have been examined. One new genus and 82 new species are described and the number of species now known in the Ethiopian Region is 128. Keys are given to genera and for each genus.

Among the species of economic importance listed are three new species feeding on leguminous crops.

The material discussed is considered to represent only a fragment of the Ethiopian Agromyzidae. It is emphasised that for further study bred material, including larvae (or puparia) and leaf-mines, would be of the greatest value.

VIII. References

Becker, Th., 1903, Ägyptische Dipteren. *Mitt. zool. Mus. Berl.* **2** : 67–195.

—— 1907, Die Ergebnisse meiner dipterologischen Frühjahrsreise nach Algier und Tunis, 1906. *Z. syst. Hym. Dipt.* **7** : 406.

Bezzi, M., 1928, *Diptera Brachycera and Athericera of the Fiji Islands*, pp. 164–5. London : British Museum (Natural History).

—— and Lamb, C. G., 1926, Diptera (excluding Nematocera) from the Island of Rodriguez. *Trans. ent. Soc. Lond.* **1925** : 537–73.

Green, E. E., *in* Cotes, E. C., 1896, An account of the insects and mites which attack the tea plant in India. *Indian Mus. Notes* **3** (4) : 28.

Fallén, C. F., 1814–27, *Diptera Sveciae.* 2 vols. Lund.

Frick, K. E., 1952, Four new Hawaiian *Liriomyza* species and notes on other Hawaiian Agromyzidae (Diptera). *Proc. Hawaii ent. Soc.* **14** : 509–18.

—— 1953, Further studies on Hawaiian Agromyzidae (Diptera) with descriptions of four new species. *Ibid.* **15** : 207–15.

—— 1959, Synopsis of the species of Agromyzid leaf-miners described from North America (Diptera). *Proc. U.S. nat. Mus.* **108** : 347–465.

Froggatt, W. W., 1919, The Lantana fly (*Agromyza lantanae*). *Agric. Gaz. N.S.W.* **30** : 665–8.

Groot, P. Van der, 1930, De *Agromyza*-vliegjes der inlandsche Katjanggewassen op Java. *Meded. Inst. PlZiekt., Buitenz.* **78** : 1–97.

Groschke, F., 1954, Miszellen über Blattminen und Blattminierer. I. *Dtsch. ent. Zeit.* (N.F.) **1** : 138–56.

Harrison, R. A., 1959, Acalypterate Diptera of New Zealand. *Bull. N.Z. Dep. Sci. indust. Res.* **128** : 308–312.

Hassan, A. S., 1947, The Beanfly *Agromyza phaseoli* Coq. in Egypt. *Bull. Soc. Fouad Ier. Ent.* **31** : 217–24.

Hendel, F., 1923, Neue europäische *Melanagromyza*-Arten (Dipt.). *Konowia* **2** : 142–5.

—— 1931–36, *Agromyzidae. In* : Lindner, *Flieg. pal. Reg.* **59**.

Hennig, Willi, 1941, Verzeichnis der Dipteren von Formosa. *Ent. Beihefte*, **8** : 1–239.

Hering, E. M., 1927, Die Minenfauna der Canarischen Inseln. *Zool. Jb.* (*Syst.*) **53** : 461.

—— 1935–37, *Die Blattminen Mittel-und Nord-Europas.* 's-Gravenhage.

—— 1940, *Melanagromyza coffeae* sp. n., a leaf-miner of the coffee plant. *Ann. Mag. nat. Hist.* (11) **5** : 471–2.

—— 1951, *Biology of the leaf miners.* 's-Gravenhage.

—— 1957, Zur Blattminenkunde von Südafrika. *Ann. Transv. Mus.* **23** : 59–80.

Jack, R. W., 1913, The Bean stem maggot. *Bull. Dep. Agric. S. Rhod.* **142** : 1–10.

Kaltenbach, J. H., 1874, *Die Pflanzenfeinde aus der Klasse der Insekten.* Stuttgart.

Koningsberger, J. C., 1897, De dierlijke vijanden van het koffiecultuur op Java. *Meded. PlTuin., Batavia* **20** : 25–26.

Lamb, C. G., 1912, The Percy Sladen Trust Expedition to the Indian Ocean in 1905. XIX. Diptera. *Trans. Linn. Soc. Lond.* **15** : 344–7.

Malloch, J. R., 1914, Formosan Agromyzidae. *Ann. hist.-nat. Mus. hung.* **12** : 306–36.

—— 1916, A new species of Agromyzid destructive to beans in the Philippines. *Proc. ent. Soc. Wash.* **18** : 93.

Malloch, J. R., 1935, *Insects of Samoa.* **6** (9) : 341. London : British Museum (Natural History).
Meigen, J. W., 1830, *Systematische Beschreibung der bekannten europäischen zweiflügligen Insekten.* Vol. 6. Hamm.
Meijere, J. C. H. de, 1910, Studien über Südostasiatische Dipteren. IV. *Tijdschr. Ent.* **53** : 160–4.
—— 1922, Zur Kenntnis javanischer Agromyzinen. *Bijdr. Dierk.* **22** : 17–22.
—— 1924, Verzeichnis der holländischen Agromyzinen. *Tijdschr. Ent.* **67** : 119–53.
—— 1934, Die Larven der Agromyzinen. Zweiter Nachtrag. *Ibid.* **78** : 244–90.
—— 1938, Die Larven der Agromyzinen. Vierter Nachtrag. *Ibid.* **81** : 61–116.
—— 1940, Die Larven der Agromyzinen. Fünfter Nachtrag. *Ibid.* **83** : 160–85.
Otanes y Quesales, F., 1918, The Bean fly. *Philipp. Agric.* **7** : 2–31.
Paulian, R., 1953, Recherches sur les insectes d'importance biologique à Madagascar. XII–XX. *Mém. Inst. sci. Madagascar* (E) **3** : 1–27.
Roser, C. L. F. von, 1840, Verzeichniss der in Würtemberg vorkommenden zweiflüglichen Insecten. *KorrespBl. landw. Ver., Würtemb.* **1** : 63.
Sasakawa, M., 1958, The female terminalia of the Agromyzidae, with description of a new genus (1). *Sci. Rep. Saikyo Univ. (Agric.)* **10** : 133–50.
Séguy, E., 1951, Diptères mineurs de Madagascar. *Mém. Inst. sci. Madagascar* (A) **5** : 309–21.
Spencer, K. A., 1957, Records of Agromyzidae in Spain, including three species new to science. *Eos, Madr.* **33** : 113–22.
—— 1958, Notes on the Agromyzidae (Dipt.) in the Naturhistorisches Museum in Wien. *Ann. naturh. Mus. Wien* **62** : 251–3.
Thomson, C. G., 1869, *Eugenies Resa. Diptera.* p. 609. Stockholm.
Tryon, H., 1895, The Bean Maggot. *Trans. nat. Hist. Soc. Qd.* **1** : 4–7.
Vanschuytebroeck, P., 1951*a*, Description d'un Diptère Agromyzidae nouveau du Congo Belge. *Rev. Zool. Bot. afr.* **44** : 167–8.
—— 1951*b*, Rectification de nomenclature. *Ibid.* **45** : 99.
Vengopal, S., 1954, An Agromyzid pest of bhendi. *J. Madras Univ.* (B) **24** : 335–40.
Wallace, G. B., 1939, French bean diseases and Bean fly in East Africa. *E. Afr. agric. J.* **5** : 170–5.